

Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

XII.

CONTRIBUTIONS TO THE BOTANY OF NORTH AMERICA.

By Asa Gray.

Communicated October 8th and December 10th, 1884.

1. *A Revision of some Borragineous Genera.*

This revision has become necessary by some recent discoveries, and by a more thorough study and appreciation of the characters of the various plants which have been referred, first by the De Candolles and afterward by Dr. Torrey and myself, to the genus *Eritrichium*. It is not pleasant to find that the conclusions now reached require considerable changes of accepted names which have received the sanction of the late Mr. Bentham in the recent Genera Plantarum, and that these changes might have been made or anticipated several years ago. But if it needs be so, the sooner they are made the better.

It plainly appears that too much has been made of the degree of obliquity of the nutlets, of their extension above the gynobase, and of the extent of their attachment to it, or, which is nearly the same thing, of the amount of growth, if any, of the developing nutlets above or below their insertion upon the more or less elevated axis (*gynobase*) which intervenes between the common torus and the style.* It seems to me equally clear that there are too great differences from species to species in *Echinospermum*, *Cynoglossum*, *Omphalodes*, *Eritrichium*, and the various plants which have been referred to these genera, to justify the two tribes *Cynoglosseæ* and *Eritrichieæ*. So that, indeed, it seems necessary to follow De Candolle in this respect, by referring all the quadrinuculate genera with lateral or introrse-basal insertion of the nutlets to the *Cynoglosseæ*, to be divided into sections as well as may be practicable. This tribe should even include *Moltkia* (*cærulea*),

* As Turczaninow long ago rightly expressed it, all the part to which the nutlets are attached is gynobase, whether it be depressed, pyramidal, conical, or subulate, or even filiform. Only the free portion above is the style.

Lehm., the nutlets of which separate from the very low-pyramidal gynobase by a manifestly lateral scar.

A few notes upon the principal genera concerned may serve as an introduction to the following systematic exposition of certain mainly North American *Borraginaceæ*.

Cynoglossum, Tourn. Some recent authors have ignored a character (peculiar to this genus and to a part of *Omphalodes*) which was well delineated by Schkuhr almost a hundred years ago, and noted by Alphonse De Candolle in the Prodromus, namely, the carrying away by the apex of each nutlet of an exterior portion or "lacinula" of the indurated and persistent style, by which the four nutlets, after splitting off from the gynobase from below upward, are for a while suspended. Although in some species the nutlets are nearly horizontal on a depressed gynobase, in others they form a low or even a considerably elevated pyramid, with corresponding elevation of the gynobase; and the areola of attachment, or scar, varies from "*supra medium*" to very manifestly *infra medium* of the ventral face. The fruit of *C. cœlestinum*, Lindl., would refer this species rather to *Omphalodes*.

Paracaryum of Boissier does seem to be a too heterogeneous and ill-limited an assemblage. As founded in 1849, and as maintained in the Flora Orientalis (1879), it includes *Lindelofia* of Lehm., 1850, although the character calls for included stamens, which is not quite true of the latter. It also calls for a funnelform corolla, with tube more or less elongated; and upon this character the genus apparently may stand, whether including or excluding *Lindelofia*, Lehm. Apparently this should be included; for the anthers emerge more or less from the throat of the corolla in *P. heliocarpum*, *P. angustifolium* or *azureum*, &c. But whether Boissier's name, given to a wider group, or Lehmann's stricter but rather later name, should be adopted, is a nice question, which I am not called upon to determine. The species with short corolla will, upon this view, fall back into *Omphalodes*, *Rindera*, and *Echinospermum*.

Echinospermum, Lehm. It seems hardly correct to attribute this genus to Swartz, simply because (as Lehmann states) he suggested the name, while the published species with which his name is indirectly connected belong to *Cynoglossum*. It would appear that a better view is taken of this genus by Bentham in the Genera Plantarum than by C. B. Clarke in the Flora of British India. The latter would in effect restrict the genus to the *Lappula* group, in which alone, or mainly, are the nutlets attached up to their apex. In some of these (as *E. Redowskii*) the nutlets are "attached above their base"; but

in most, from very base to apex. In the group of which *E. deflexum* is the type, the scar is more or less supra-basal (in *E. hispidum* almost central and oval), and the apex of the nutlet is more or less free beyond it. *E. glochidiatum*, A. DC., which Bentham refers to *Paracaryum*, is surely a true *Echinospermum*, allied to *E. Virginicum*. *E. canum*, Benth. in Royle, Ill., which C. B. Clarke takes to be "the type of the genus *Echinospermum* as described in the Genera Plantarum," but which he refers to a glochidiate section of *Eritrichium*, is surely of the former genus. As to the exact position and length of the scar, Bentham's character of his *Eritrichieæ*, "nuculis . . . apicibus circa stylum plus minus prominentibus erectis *liberis*," applies to some, but not to all, of the plants he referred to *Echinospermum* and to *Eritrichium*. The importance given to this character and to the corresponding height of the gynobase in the Cynoglossoid genera has not led to good practical results. The glochidiate armature of *Echinospermum* and *Cynoglossum* may still be regarded as essential to the character.

Sclerocaryum is with good reason referred back to *Echinospermum* by Boissier. Its stout spines are not indistinctly glochidiate at the blunt apex. *E. Sinaicum* (*Eritrichium Sinaicum*, DC.) is apparently a congener.

Echinoglochin, Gray, Proc. Am. Acad. xii. 163, and Syn. Fl. ii. 190, I would still retain as a section of *Echinospermum*, coming nearest to *Krynitzkia*. Also the section *Homalocaryum*, A. DC., now containing a good number of species, should be kept distinct from the section *Lappula*. In the supra-basal insertion of the nutlets of some (but not all) of the species, as well as in habit, this group comes nearest to *Cynoglossum* and to *Omphalodes*. In the *Lappula* section the published name *E. Fremonti*, Torr. in Pacif. R. Rep. xii.[2] 46, has been accidentally omitted from Syn. Fl. ii. 190. It is a synonym of *E. Redowskii*, var. *occidentale*.

Omphalodes, Tourn. By leaving *O. linifolia*, *O. littoralis*, and *O. amplexicaulis* in this genus, Boissier and Bentham seem to abandon most of the ground on which the former's genus *Paracaryum* rests, except as to the longer-flowered species. For the species of *Omphalodes* above mentioned have a high-pyramidal gynobase, on which the nutlets are borne, for the most part in an ascending position; and their attachment extends to below the middle of the ventral face. (The nutlets carry away with them a "lacinula" of the style, in the manner of *Cynoglossum*.) Rotate or short hypocraterimorphous corolla, somewhat supra-basal or ventral attachment of nutlets, these

with depressed back surrounded by a wing or margin which at maturity is reflexed or revolute, and its teeth or laciniæ when present not glochidiate (although the disk is sometimes so), would appear to be the essential characters of *Omphalodes*.

Eritrichium, Schrad., was founded upon the European *Myosotis nana* of Villars, and the generic name is appropriate. Schrader gave no character except that the carpophore at maturity is "conica vel hemisphærico-conica," and the genus was first characterized by Gaudin and by Koch. The younger Reichenbach in the Icones Fl. Germanicæ notes its extreme nearness to *Omphalodes*, but distinguishes it mainly by the somewhat doubled fornices of the corolla. It really appears to be a good *Omphalodes*. Reichenbach's figures represent the short attachment of the nutlets as nearly central; that of Spenner, in Gen. Fl. Germ. Ill., as intra-basal. The oblique position of the half-grown nutlets is well shown in the recent plate in Bot. Mag. t. 5853. A full examination of the fruit and flowers of this species and the other true or dorsally appendaged *Eritrichia* convinces me that they should be referred to *Omphalodes*, from which they may be somewhat indefinitely distinguished as a section. The obviously excessive development of the genus *Eritrichium* in quite another direction began with the De Candolles in the Prodromus, was first followed by my venerated associate Dr. Torrey, was carried further by myself in Proc. Am. Acad. x. 55, &c., and was adopted by Bentham in the Genera Plantarum, but with the excision of two Candollean sections, one of them referred to *Mertensia*, the other (*Endogonia*) re-established as the genus *Trigonotis*, Stev. As I am responsible for the suppression of Fischer and Meyer's two genera, *Krynitzkia* and *Plagiobothrys*, I must now make amends by reinstating them and giving them the full development which they may rightfully claim. Although they make some near approaches to neighboring genera and to each other, yet, on the whole, they are as distinct as are most genera of *Boragineæ*, and we cannot do without them. As to true *Eritrichium*, those who may not accept its reduction to a subgenus of *Omphalodes* will probably agree to the proposed limitation of the group.

Krynitzkia, Fischer & Meyer, has the nutlets always attached by the inner side of the base, or from this upward in various degrees, even to the apex, on separation leaving a clean naked scar, or a scar narrowing into a groove, or sometimes a narrow groove only. And between these there are all gradations. The nutlets are naked and convex on the back, and otherwise wholly unappendaged, except that a few have plane-winged margins.

Anoplocaryum, Ledeb., of a single (Siberian) species, with rather the habit of *Trigonotis*, differs from *Krynitzkia* in having its smooth and erect nutlets attached *above* the base for some length by a very narrow cariniform caruncle (if it may be so called) to a conical-subulate gynobase, and the sepals in fruit are spreading.

Plagiobothrys, Fischer & Meyer, is certainly a good genus, of considerable extent and diversity, although the original character is applicable to only one species. Its essential characters are found in the insertion of the (ovate or trigonous) nutlets by a small portion of the ventral face, mostly by near the middle (sometimes nearer to the base, rarely nearer the apex), by means of a sort of caruncle, which remains on the nutlet. The fall of the ripe nutlets, which is usually tardy, leaves as many excavations or sunken areolæ on the globular, or in one species more elevated and in most of them more depressed, gynobase. The caruncle in the typical species is annular, bordering a deep and round umbilical cavity of the nutlet itself, — a character to which the generic name refers. Up to this year, however, I could find no such excavation (and evidently Bentham was in the same case); so I had ventured to assert that the character of Fischer and Meyer and of De Candolle might be incorrect. But I have now received specimens from three localities in California (one from the extreme northern border, and one from the southern part of the State), which well exhibit this character. Once made known, I have been able to verify it upon quite immature fruits of a Chilian plant from Bertero's collection. All doubtless belong to the original *P. rufescens*. I find in another Chilian species an annular caruncle, unaccompanied by any manifest excavation. The species of *Eritrichium* § *Plagiobothrys* in my Synoptical Flora, although with solid and more or less projecting caruncle, are evidently congeneric, even to *E. Kingii*, which, when mature fruit was unknown, was thought to effect a clear transition to *Krynitzkia*. *Echidiocarya Californica* and (yet more obviously) *E. ursina* are also of the genus, differing only in the more salient or stipitiform and indurated caruncle. This leaves *Echidiocarya* with a single species, of very peculiar fruit.

Microula, Benth., of a single species from Tibet, in Strachey and Winterbottom's collection, essentially accords with a section of *Plagiobothrys*, which has glomerate inflorescence and high insertion of nutlets by means of a soft caruncle. But in *Microula* this is small and somewhat evanescent. The "subsessile glochidia," as they are called in the Flora of British India, are so minute and sparse that they need hardly be taken into account; but the genus may perhaps be kept up, partly on geographical considerations.

Bothriospermum, Bunge, as arranged and characterized by Bentham in the Genera Plantarum, would appear to have essentially the same carpological structure as the typical *Plagiobothrys*, and therefore to supersede the latter. But this comes from one of the very rare oversights of the late Mr. Bentham, who, unmindful of the correct description by Bunge, and afterwards by De Candolle and by Maximowicz, mistook the ventral false umbilicus for the areola of insertion, which is basal. The mistake remains uncorrected in the Flora of British India.

The conclusions now arrived at lead to the following re-arrangement of the American species which are thereby affected.

OMPHALODES, Tourn.

Corolla rotata vel brevissime hypocraterimorpha. Stamina inclusa. Nuculæ adscendentes vel subhorizontales, intus (aut supra medium aut versus basim) gynobasi pl. m. elevatæ affixæ, dorso depressæ vel complanatæ, ala nunc integra nunc dissecta (rarius evanida) retrocurva vel revoluta (dentibus laciniisve haud glochidiatis) circumdatæ.

§ 1. EUOMPHALODES. Nuculæ pl. m. obcompressæ, intus haud carinatæ, pericarpio alaque sat tenuibus. — Gerontogeæ, sequentibus alienis facie *O. vernæ* pæne similibus exceptis.

O. ALIENA, Gray in Hemsl. Bot. Biol. Centr.-Am. ii. 377. Laxe hirsuta, brevicaulis; foliis insigniter cordatis longe petiolatis; racemis elongatis ebracteatis; pedicellis gracilibus, fructiferis deflexis vel recurvis; corolla cærulea; nuculis suberectis ala lata orbiculata margine breviter multidentata radiato-expansa demum (saltem fl. inferiorum) plicato-retroflexa, areola insertionis centrali obscura; cotyledonibus obovatis; gynobasi pyramidata demum angusta. — Northern Mexico at Monterey, Nuevo Leon, coll. *Palmer*, 893. Geography to the contrary notwithstanding, this must be accepted as a true *Omphalodes*, in essential character as well as in habit. Even if the wing of the nutlets were always explanate, this is no more so than in *O. amplexicaulis*, and the gynobase is hardly higher or narrower. Moreover, in the nutlets of some of the lower and consequently older blossoms, the wing is completely folded backward upon itself. As the body in these is hispidulous while the upper ones are almost glabrous, I had suggested that the fruit was probably dimorphous, and Mr. Hemsley in his account has mentioned this. But perhaps it is only a difference in age. When it falls away from the gynobase, the convex ventral surface shows no scar, or only faint marks of attachment about the middle; when younger,

the attachment seems to be from "just above the base to the apex" of the body, as Mr. Watson describes it in the account of Palmer's collection (Proc. Am. Acad. xviii. 121). There are indications that, in separating, a minute lacinula of the style is sometimes carried away, as in most of the European species. In Hemsley's description this and the following species are said to be annuals. Our specimens are not decisive in this respect; they appear rather to denote a perennial growth from slender running rootstocks.

O. CARDIOPHYLLA, Gray, l. c. Præcedenti similis; pedicellis plerisque oppositifoliis vel extra-axillaribus, paucis in racemum fere ebracteatum digestis; "corolla alba"; nuculis calycem subpatentem haud superantibus crassioribus brevi-ovalibus basim versus gynobasi pyramidata parum elevata adfixis, dorso sursum spectante ala mox retroflexa in dentes elongato-subulatos multipartita circumdato; cotyledonibus orbiculatis. — Northern Mexico, in mountains near Saltillo, coll. *Palmer*, 894. — Closely related as this species is to the foregoing, its nutlets in structure, insertion, and all but the thinner and softer texture, are very much like those of the original *Eritrichium*.

§ 2. ERITRICHIUM. (*Eritrichium*, Schrad. Diss. Asperif., Gaudin, Koch, Reichenb. Ic. Fl. Germ.) Nuculæ dorso sursum oblique spectante tantum complanatæ, intus carinatæ, pericarpio dentibusque subcartilagineis. — Amphigææ, alpinæ vel montanæ, nanæ, perennes.

* Amphigea alpina et arctica, albo-villosa.

O. NANA, cum var. ARETIOIDES et var. CHAMISSONIS. *Eritrichium nanum*, Schrader, cum vars. *aretioides* et *Chamissonis*, Herder in Radde; Gray, Syn. Fl. ii. 190. To the synonymy add the excellent figure, from the European plant, of Hook. f. Bot. Mag. t. 5853, which well exhibits the oblique position of the forming nutlets.

* * Boreali-Americana, cano-strigosa, nuculis calvis!

O. HOWARDI. *Cynoglossum Howardi*, Gray, Syn. Fl. ii. 188. Dense cæspitosa, pube sat molli argenteo-incana; foliis caudiculorum confertissimis lineari-spathulatis, caulium floriferorum brevium linearibus sparsis; cyma aut dichotoma aut simplici racemiformi pauciflora parce bracteata; sepalis linearibus corollæ cœruleæ lobis paullo brevioribus; nuculis nitidis dorso oblique truncatis exalatis, sed disco dorsali plano ovato acutiusculo angulato-marginato aut lævi aut minute papuloso et puberulo. — Rocky Mountains in Montana, *Winslow J. Howard*, coll. in flower only, about the year 1866; on Mount St. Helena, Montana, Canby, 1883, with mature fruit; Cascade Mountains, Washington Terr., *Frank Tweedy*, 1882, in flower. In Proc. Am. Acad.

xvii. 225, I had too confidently guessed this little plant to be the *Cynoglossum ciliatum* of Douglas, which is possibly a congener, but for the present is taken for an *Echinospermum*. But Mr. Canby, by collecting the fruit, has made it clear that the present plant is, as its habit would denote, a congener of *O. nana*. As far as known, the present species has the edentate nutlets of *O. rupestris*, especially of the form which Maximowicz named *Eritrichium Maackii;* but from its analogy with that species we may expect varieties with more or less pectinate teeth on the angled border.*

KRYNITZKIA, Fisch. & Meyer, ampliata.

Corolla rotata vel hypocraterimorpha, tubo brevi calycem (fructiferum erectum vel vix patentem) rarissime superante. Stamina inclusa. Nuculæ erectæ et rectæ, nudæ, rarove angulis lateralibus patenti-alatis, intus basi tantum vel altius vel ad apicem usque gynobasi nunc parum nunc longe elevatæ adfixæ; areola pl. m. impressa vel sulco insertionis prorsus nuda. — Herbæ annuæ vel paucæ perennes, plerumque Occidentali-Americanæ, floribus albis sæpissime parvis. — *Krynitzkia*, Fisch. & Meyer, Ind. Sem. Hort. Petrop. vii. (1841) 52. *Krynitzkia* & *Eritrichium* sect. v.–vii., A. DC. Prodr. x. 128–134. *Eritrichium* § *Krynitzkia*, § *Eueritrichium Myosotidea*, & *Antiphytum*, Gray, Proc. Amer. Acad. x. 55, & Syn. Fl. ii. 191–197, 199.

§ 1. AMBLYNOTUS. Nuculæ (lithospermoideæ) *cartilagineæ* vel *crustaceæ*, ovatæ, dorso (una excepta) rotundatæ, intus basi aliquandoque paullo altiore gynobasi convexæ vel depresso-pyramidatæ adfixæ.

* O. RUPESTRIS (*Myosotis rupestris*, Pall., *Eritrichium rupestre*, DC.) would be the proper name of this N. Asiatic species, which, according to Maximowicz (Diagn. Dec. xi. 546), includes also *E. pectinatum*, DC., as a form with pectinately fringed border to the nutlets. Herder keeps up two species, but apparently refers too many Himalayan forms to the latter.

O. VILLOSA. *Eritrichium villosum*, A. DC. Prodr. x. 126, cum syn. *E. latifolium*, Ruprecht? Herder's reference to this as found on our Rocky Mountains was caused by taking the name from S. Watson, who (in Bot. King, 240) followed Hook. f. in his Memoir on Arctic Plants. Some forms of *O. nana* do indeed much resemble *O. villosa*.

O. SCHRENKII = *Echinospermum rupestre*, Schrenk in "Bull. Acad. Petrop. ii. 194," & DC. Prodr. x. 140. This has the habit of *O. rupestris*, and, although anomalous, should go with it rather than into *Echinospermum*. The nutlets are quite erect, indeed, but their narrow wing is strictly turned over upon the back, and the few and short teeth which it bears are not at all glochidiate.

* Species Boreali-Asiatica, facie *Omphalodium* § *Eritrichii* regionis, perennis: nuculæ læves, dorso rotundato carina obsoleta, ventre carina acuta instructa, areola insertionis rotundata. — *Eritrichium* § *Amblynotus*, A. DC. Prodr. x. 128.

K. OBOVATA. *Myosotis obovata*, Ledeb. *Eritrichium obovatum*, A. DC. l. c.

* * Species Californica, annua, *Krynitzkiis typicis* facie referens: nuculæ lævissimæ, nitidæ, dorso carina prominula ventre sulco angustissimo percursæ, areola insertionis brevi-lineari sulciformi a basi ad quartem partem attingente.

K. LITHOCARYA, Greene, ined. — Lakeport, Lake Co., California, 1884, *Mrs. Layne-Curran.*

* * * Species Texano-Mexicanæ, anomalæ, ramosæ, caulibus basi pl. m. indurata diu persistente vix perennantes: nuculæ turgide ovatæ, dorso latæ omnino rotundatæ, papulis undique asperatæ, intus acute carinatæ, basi parum protuberante areola rotundata adfixæ. — *Antiphytum*, A. DC. pro parte; Gray, Proc. Am. Acad. x. 54, & Syn. Fl. ii. 199.

Antiphytum, as founded by De Candolle upon Moçino's drawing of a Mexican species, is utterly obscure; as propounded by him in Meissner's work it is apparently a good genus for Brazilian species with opposite leaves, for which Bentham re-establishes it. But the following species, as Bentham indicated, must be allowed to fall into the present genus. Although somewhat peculiar in habit, it comes well into the present section as now extended.

+– Sat elatæ, paniculatæ.

K. HELIOTROPIOIDES. *Antiphytum heliotropioides*, A. DC. Prodr. x. 122; Gray, l. c. *Eritrichium heliotropioides*, Torr. Bot. Mex. Bound. 140.

K. FLORIBUNDA. *Eritrichium floribundum*, Torr. l. c. *Antiphytum floribundum*, Gray, l. c. — Corolla fauce nuda.

+– +– Humilis, condensata; foliis parvis.

K. PARRYI. *Antiphytum Parryi*, Watson, in Proc. Am. Acad. xviii. 122. — Between San Antonio, Texas, and San Luis Potosi, Mexico, coll. *Parry*, no. 618, in part.

§ 2. MYOSOTIDEA. Nuculæ basi intus areola brevissima vel brevi gynobasi depressæ vel parum elevatæ adfixæ, pl. m. ovatæ, rugosæ, opacæ, parum induratæ, ventre sæpius dorso quandoque carinatæ. Herbæ humiles, sæpius tenellæ. — *Eritrichium* § *Eueritrichium Myosotidea*, Gray, l. c.

* Annuæ.

+– Sæpius diffusæ, parvifloræ; corolla calycem parum superante, limbo vix ultra lineam lato; sepalis quandoque post anthesin folioso-ampliatis.

K. PLEBEIA. *Lithospermum plebeium*, Cham. & Schlecht. *Eritrichium (Rutidicaryum) plebeium*, A. DC. Prodr. — Aleutensis: caules laxi ad apicem usque foliati.

K. CALIFORNICA. *Myosotis Californica*, Fisch. & Meyer. *Eritrichium Californicum*, DC. Nuculæ ovato-oblongæ, rugis obtusis parcis notatæ, læves vel scabriusculæ. — In the alkaline wet soil which this species affects, the herbage is apt to become succulent and the calyx accrescent. Such forms especially pass into the notable

Var. SUBGLOCHIDIATA. Nuculis scabridis vel subtuberculatis aut parce aut insigniter hirtellis, setulis sæpe fasciculatis (nunc basi in fasciculum coalitis) apice vel simplicibus vel furcatis vel penicillatis etiam subglochidiatis. — *Eritrichium Californicum*, var. *subglochidiatum*, Gray, Syn. Fl. ii. 191. The specimens of Watson and others from the Great Basin and eastward are mostly of this variety; but it also occurs in the valley of the Sacramento, &c., both in succulent and unaltered forms.

+– +– Laxæ, corollæ limbo lin. 1–2 lato, nuculis asperato-rugosis.

K. TRACHYCARPA. Erecta vel diffusa, facie præcedentis; foliis inferioribus sæpe oppositis; nuculis late ovato-trigonis rugis crebris reticulatis acutis hinc inde muricatis pl. m. asperatis nunc inter rugas sæpius granulatis; areola insertionis oblonga. — California in Sonoma Co., *Brewer*, and San Joaquin Valley, *Greene*. I have this in a depauperate form from a Chilian collection made near Valparaiso in 1856 by Dr. Harvey, and in a tall form with opposite leaves, quite to the inflorescence in Reed's Chilian collection, named at Kew *Eritrichium uliginosum*, Philippi. Wherefore it may be suspected to be the *Lithospermum muricatum* of Ruiz & Pavon (*Eritrichium? muricatum*, A. DC.), and probably it may have other specific names; none of them, however, can be safely adopted. It is one of the species which connect the present section with *Eukrynitzkia*.*

* The South American species of this section seem to be few, but under several names. They should be worked up by a botanist having access to most of the originals.

K. LINIFOLIA (*Anchusa linifolia*, Lehm., *A. oppositifolia*, HBK. in the same year, *Antiphytum linifolium*, DC., and *Eritrichium linifolium*, Weddell) is the Andean species with wholly or chiefly opposite leaves and radicant bases of the tufted

+ + + Floridæ, corollæ limbo ratione calycis majusculo valde rotato-explanato, fornicibus conspicuis; nuculis rugosulis.

K. CHORISIANA. *Myosotis Chorisiana*, Cham. & Schlecht. *Eritrichium Chorisianum*, DC., Gray, Syn. Fl. ii. 191, cum syn. — Pube parca sæpius adpressa; floribus laxe pedicellatis.

K. SCOULERI. *Myosotis Scouleri*, Hook. & Arn. *Eritrichium Scouleri*, A. DC. l. c.; Gray, l. c., cum syn. — Facie præcedentis, floribus in spicis strictis subsessilibus.

K. COOPERI. *Eritrichium Cooperi*, Gray, Proc. Am. Acad. xix. 89. — Facie *K. Scouleri*, magis diffusa vel decumbens, setis patentibus hispida. — In the Mohave district, *Cooper, Parish.*

* * Perennans, caulibus decumbentibus basi repentibus radicantibus; pube villosa sat molli; corollæ limbo rotato-patente lin. 3–4 lato; nuculis fere *K. Californicæ*, sed areola insertionis prorsus introrsa ovato-lanceolata gynobasi oblongo-pyramidatæ adfixæ.

K. MOLLIS. *Eritrichium molle*, Gray, Proc. Am. Acad. xix. 89. — Wet borders of ponds, Sierra Valley, California, *Lemmon*. A rougher form from near Visalia, *Congdon*. A transition from the present section to *Eukrynitzkia*. The scar usually extends up to nearly one third the length of the ventral face, and the gynobase is correspondingly high; but this varies somewhat, and in Congdon's specimen it is shorter.

§ 3. EUKRYNITZKIA. Nuculæ (nunquam rugosæ) angulo vel sulco ventrali ab ima basi nunc fere ad medium nunc apicem usque gynobasi elevatæ adfixæ, dorso convexo nec carinato nec angulato, lateribus obtusis rarove angulato-acutis nunquam marginatis: calyx fructifer erectus vel clausus: corolla parva, tubo brevi calycem haud superante, basi exannulato, fauce aut nuda aut fornicibus haud exsertis instructa. — Herbæ annuæ, floribus plerumque sessilibus scorpioideo-spicatis. — *Eritrichium* § *Krynitzkia*, div. *Eukrynitzkia*, Gray, l. c.

stems. It must include *Eritrichium pygmæum*, Weddell (*Anchusa*, HBK.), and apparently a part of his *E. humile*, such as the var. *congestum*, Mandon's no. 381, to which Weddell's figure answers, except as to the fruit, and which is certainly not Brotero's no. 445, of Chili. The nutlets of *K. linifolia* are attached by an oval or barely oblong scar, and the back is coarsely reticulate-rugose, not at all "granulate-tuberculate."

K. TENUIFOLIA, the "*Eritrichium tenuifolium*, Schlecht." of Lechler's Pl. Chilenses, no. 255, which has nutlets strictly of this group, must, from habitat and character, be the *Eritrichium humile*, var. *capillatum* (misprinted "*capitatum*") of Gay, Fl. Chil., which Weddell refers to as different from *E. humile*. It is quite uncertain what *Myosotis humilis*, Ruiz & Pav., an annual, can be, and what is Lehmann's, described as with a perennial and fusiform fibrillose root.

* HOLOCALYX, i. e. calyx fructifer non circumscissus, basi ipsa vel pedicello brevissimo intermediante rhachi pl. m. articulatus, haud raro cum fructu incluso secedens.

+– *Costatæ, Cismontanæ:* sepala nunquam angustissima, costa valida rigida, fructifera in prioribus insigniter incrassata percursa: nuculæ sæpissime opacæ, areola intrabasali (*K. Texana* excepta) manifesta: herbæ diffuso-ramosæ, hispidæ, sæpius asperæ.

++ *Hetero-* vel *Monocaryæ:* calyx fructifer inferne arcte clausus, costis insigniter cartilagineo-incrassatis.

K. CRASSISEPALA. *Eritrichium crassisepalum*, Torr. & Gray, Pacif. R. Rep. ii. 171. — Spicæ inter flores bracteatæ. Calyx fructifer in pedicello brevissimo etiam indurato diu persistens. Nuculæ ovatæ, acutæ, vix ultra medium gynobasi angusto-pyramidatæ adfixæ, tres dorso papilloso-muriculatæ et areola oblongo-lanceolata excavata insertæ; una major, lævis, diu persistens. — This species extends from the Saskatchewan to New Mexico.

K. TEXANA. *Eritrichium Texanum*, A. DC. Prodr. x. 130. — Elatior, spicis demum laxis plerumque ebracteatis. Calyx fructifer angustus costis angustioribus, subsessilis, maturitate fructu incluso secedens. Nucula solitaria (3 abortientibus), sat magna, parum meniscoidea, creberrime minutimque puncticulata, cæterum lævis, ventre a basi fere ad medium carina tenui gynobasi adfixa, diu persistens, delapsa basi lacera.

++ ++ *Homocaryæ:* nuculæ 4 fertiles conformes, gynobasi angustiori adfixæ, læves, ovato-acuminatæ, vix lineam longæ, sulco ventrali ima basi in areolam paullo excavatam subtriangularem repente dilatato: calyx fructifer (lin. 2 longus) minus clausus, setis pungentibus hispidus, costis prominentibus sed minus crassis: spicæ basi tantum bracteatæ vel ebracteatæ.

K. PATTERSONI. Humilis, a basi diffusa; foliis angusto-spathulatis seu linearibus; sepalis lineari-lanceolatis costa demum prominente: nuculis a basi ad medium (vel paullo ultra) gynobasi subulato-pyramidatæ adfixis, una quandoque magis persistente. — At the base of the Rocky Mountains in Colorado; coll. *H. N. Patterson*, 1875, *J. D. Hooker* and *A. Gray*, 1877. A species till now overlooked, connecting the following with the preceding group.

K. FENDLERI. Erectus, subpedalis, paniculato-ramosus, rigidulus; foliis linearibus; sepalis fructiferis angusto-linearibus; nuculis sursum magis attenuatis fere ad apicem usque gynobasi angusto-subulatæ adfixis. — Along the eastern base of the Rocky Mountains, from the

Saskatchewan district (Hand Hills, *Macoun*) to Colorado, Northern New Mexico, and apparently in Arizona; coll. *Fendler*, *Hall*, *Parry*, *Vasey*, *Porter*, *Rusby*, &c. It has been unwarrantably confounded with *K. leiocarpa*, &c.

+– + *Typicæ*, *Transmontanæ*, *Leiocaryæ:* nuculæ lævissimæ, nitidæ, acutæ vel acuminatæ, pericarpio sat tenui, sulco ventrali tenui percursæ, basi haud vel minime areolatæ, gynobasi angustæ adfixæ: sepala angusta, costa nunc prominula nec incrassata instructa: herbæ diffusæ vel erectæ, graciles, calycibus setoso-hispidis.

++ *Eremocaryæ:* nucula solitaria (rarissime 2, cæteris abortientibus), angusta, acuminata, inferne triente parte tantum gynobasi brevi angustæ adfixa, itaque sursum longius libera (*Amblynoti* modo), areola intrabasali vix ulla: herbæ graciles, erectæ; spicis sæpius conjugatis ternisve ebracteatis, calycibus fructiferis arcte sessilibus rhachi plerumque adpressis.

K. OXYCARYA. *K. leiocarpa*, Benth. Pl. Hartw. 326, non Fisch. & Meyer. *Eritrichium oxycaryum*, Gray, Proc. Am. Acad. x. 58, & Syn. Fl. ii. 193. *Myosotis flaccida*, Dougl. in Lehm. Pugill. ii. 22, & Hook. Fl. ii. 82; Hook. & Arn. Bot. Beech. 369. Pube brevi strigulosa arcte adpressa subcinerea; caule sæpius stricto ultrapedali; foliis linearibus vel lineari-spathulatis; calyce fructifero (circa lin. 2 longo) segmentis lineari-filiformibus crassiusculis, versus basim setis crebris *deflexis* (validis haud pungentibus, apice attenuato debili nunc incurvo) hispidissimis, superne nudiusculis vel setis brevioribus instructis; nucula majuscula subtereti ex ovata longius acuminata quasi rostellata. — Not rare from S. California to Washington Territory. When we did not possess specimens north of California, I referred the original *Myosotis flaccida*, described by Lehmann, to *K. leiocarpa*, partly because of the "nuces 4" in the description. But I now learn that original specimens from "barren grounds in the interior of the Columbia" have solitary nutlets, and are of this well-marked species.

K. MICROSTACHYS, Greene in herb. Setis breviusculis patentibus pl. m. hirsuto-hispida; caule ramoso semipedali ad bipedalem; foliis aut angusto- aut lato-linearibus; calyce fructifero lineam ad sesquilineam longo setis subpungentibus longis patentissimis (nec deflexis) hispido vel hispidissimo, segmentis minus attenuatis; nucula ovato-lanceolata sensim acuminata ventre parum complanata sulco manifesto ima basi subfurcato percursa. — California, near Tejon, *Xantus*, no. 84, 86 (*K. leiocarpa*, & *Eritrichium?* spec., Gray, Jour. Bost. Nat. Hist. Soc. vii. 147); Los Angeles, *Nevin;* San Diego, *Pringle* (the

least hispid and narrowest-leaved form, nearly approaching the preceding species, and distributed as *Eritrichium oxycaryum*, coll. April 6, 1882); Colusa Co., 1884, *Mrs. Layne-Curran*, a depauperate and very slender form. The spreading bristly hairs sometimes abound on the stems as well as the leaves.

++ ++ *Eutypicæ:* nuculæ sæpius 4 fertiles, gynobasi angustæ elevatæ adfixæ, haud areolatæ,

= Intus tota longitudine sulco tenui basi nec furcato nec in areolam explanato percursæ: herbæ humiles, laxæ vel diffusæ, piloso-hispidæ; foliis lineari- vel oblongo-spathulatis; spicis cymæ simplicis vel bipartitæ laxifloris vel interruptis basi sæpius foliatis, vel floribus primariis alaribus et pseudo-axillaribus; calycibus fructiferis lin. 2 longis; corollis minimis.

K. LEIOCARPA, Fisch. & Meyer, Ind. Sem. 1841, 52; A. DC. Prodr. x. 134. *Echinospermum leiocarpum*, Fisch. & Meyer, op. cit. 1835, 36. — Nuculæ parvæ (vix ultra semilineam longæ) ovatæ, acutæ, paullo obcompressæ, fere tota longitudine sulci recti gynobasi subulatæ adfixæ. — Western California, from Monterey (where Dr. Parry collected a low and rather stout form, with oblong leaves) northward, probably to Oregon and Washington Territory. But the only determinable specimens in our herbarium, except early cultivated ones, directly or indirectly from the originals raised at St. Petersburg, were collected by Dr. Kellogg on the Californian coast, either near San Francisco or farther northward. Under the name of *Eritrichium leiocarpum*, first used by S. Watson in Bot. King Exped. 244 (who, however, did not collect the genuine plant), three or four smooth-fruited species have been confounded. These may now, upon the re-establishment and extension of the genus *Krynitzkia*, be distinguished mainly by characters of the fruit, which seem to be good, although rather fine. In the present and the following species the slender ventral groove by which the nutlet is attached runs to its very base, without the furcation of the next succeeding species, and without any expansion into a scar.

K. AFFINIS. Nuculæ lineam vel ultralineam longæ, turgidæ, subutriculatæ (pericarpio tenuiori), ad medium usque gynobasi tenuiter pyramidatæ adfixæ, sepalis lineari-lanceolatis aut paullo aut dimidio breviores. — On the eastern side of the Sierra Nevada, California to Washington Terr. and Idaho. The specimens now in hand are: E. side of the Cascades near lat. 49°, *Lyall*, 1860. Beaver Cañon, Idaho, *Watson*, 1880. Falcon Valley, Washington Terr., *Suksdorf*,

1880. Oregon, without locality, *Howell*. Near Donner Lake, *Torrey*, 1865. Strong's Cañon, near Truckee, *Mrs. Layne-Curran*, 1884. It has, with others, passed under the name of *Eritrichium leiocarpum*, and in appearance is most like the original *Krynitzkia*.

= = Nuculæ faciebus interioribus fere planis exteriori convexiuscula pl. m. trigonæ, angulo interiori sulco tenui juxta basim divaricato-furcato sed clauso: herbæ erectæ, sæpe pedales; spicis cymæ bene evolutæ (simplicis vel conjugatæ) ebracteatis.

K. TORREYANA. *K. leiocarpa*, Torr. Bot. Mex. Bound. 142, at least in part. *Eritrichium leiocarpum*, Watson, Bot. King Exped. 244, in large part; Gray, Proc. Am. Acad., & Syn. Fl. ii. 194, in large part and by char., excl. syn. Fisch. & Meyer and Dougl. — Hirsuto-hispida; calyce (præter pubem villosam) setis pungentibus patentissimis hispido, fructifero sepalis sursum attenuatis; corollæ pl. m. exsertæ limbo lin. 1–2 lato; nuculis (lineam longis) ovatis acutis usque ad medium tantum gynobasi subulato-pyramidatæ adfixæ. — Nearly throughout California, and east to Nevada and southwestern parts of Idaho. This species, now distinguished from its allies, may well bear the name of Dr. Torrey, who was an early investigator of this group, and who himself more than once collected it, whether or not it be the one he had mainly in view as *K. leiocarpa* in his references in Bot. Mex. Boundary, &c. But what he so called in Pacif. R. Rep. iv. 124 is *K. oxycarpa*. The calyx varies in length, &c., evidently passing into

Var. CALYCOSA. Forma sæpius robusta, congestiflora; sepalis calycis fructiferi pl. m. elongato-attenuatis lin. 2–3 longis rigidulis, costa validiori. *Eritrichium leiocarpum*, Watson, Bot. King Exped. l. c., quoad "calyx-lobes linear, becoming much elongated." — E. Humboldt Mountains, Nevada, *Watson*, and a form approaching it, coll. in Nevada by *J. D. Hooker* and *A. Gray*, 1872. Lake Co., California, *V. Rattan*, 1884, a form seemingly abnormal by the capitate-congested inflorescence and much prolonged sepals.

K. WATSONI. Minus hispidula, gracilis; sepalis calycis fructiferi vix lin. 2 longi parce setoso-hispidi lanceolatis parum attenuatis; corolla parva; nuculis (lineam longis) angustis subtriquetris circumscriptione fere oblongo-lanceolatis tota fere longitudine gynobasi filiformi-subulatæ adfixis. — Wahsatch Mountains, Utah, at 6,000 feet, *S. Watson*, 1869, a part of *Eritrichium leiocarpum*, Bot. King Exped. l. c.

++ ++ ++ *Asperulæ Anisocaryæ:* nuculæ sat angustæ, punctis creberrimis scabræ, sæpius heteromorphæ, ventre sulco inferne ampliato

fere tota longitudine gynobasi subulatæ adfixæ: herbæ diffusæ, parvifloræ; spicis bene evolutis ebracteatis; calycibus fructiferis (haud ultra semilineam longis) setis validis divaricatis pungentibus armatis.

K. ANGUSTIFOLIA. *Eritrichium angustifolium*, Torr. Pacif. R. Rep. v. 363 & Bot. Mex. Bound. 141. Humilis, demum ramosissima diffusa; foliis linearibus; setis calycis fructiferi eo vix brevioribus; nuculis scabridis subtrigonis, sulco infra medium vel juxta basim subdeltoideo-ampliato, aut fere homomorphis aut sæpius 2 vel 3 triangulari-ovatis et 1 vel 2 longioribus angustioribus circumscriptione ovato-lanceolatis, brevioribus quandoque abortivis. — This species is characteristic of the Mohave Desert, but it extends into Arizona as far as to Tucson. And from insufficient specimens sent in 1884 by Suksdorf, from Morgan's Ferry, Yakima River, it would appear to have made its way northward even to Washington Territory.

K. DUMETORUM, Greene in litt. Laxe ramosa, in dumetis quasi scandens; foliis ramealibus oblongis seu lanceolatis papilloso-hispidis; sepalis fructiferis lanceolatis; nuculis angustis acuminatis hirtello-scabris heteromorphis, 3 oblongo-lanceolatis subteretibus ventre sulco aperto infra medium latiore, una multo majore ovato-lanceolata in gynobasi subulata persistente calycis segmentis 2 ultra medium in unicum coalitis arcte fulcrata! — Southern California, at the Tehachapi Pass, *Mrs. Layne-Curran*, coll. 1884. The examination of the single fruiting branch received shows this to be a peculiar species, of evident relationship to the foregoing. The fruiting calyx is distorted or made gibbous at base by the enlargement of the persistent akene (of fully a line in length), round which the two united subtending sepals are half wrapped. More specimens are desirable for ascertaining if these peculiarities are constant.

++ ++ ++ ++ *Trachycaryæ Ebracteatæ:* nuculæ homomorphæ, ovato-trigonæ, dorso præsertim papillis acutis muricatæ vel scabratæ, ad apicem vel subapicem usque sulco longo basi aut furcato clauso aut in areolam pl. m. dilatato gynobasi subulatæ adfixæ; herbæ plerumque erectæ, hispidæ; spicis fructiferis rite evolutis ebracteatis; calycibus setis pungentibus patentissimis hispidis.

= Calycis fructiferi sepala 4–2 lin. longa, attenuato-linearia, costa prominula percursa, nuculas acutas vel acuminatas longe superantia.

a. Herbæ insigniter villoso-hispidæ, id est setis pilisque gracillimis plerumque albis barbatæ.

K. BARBIGERA. *Eritrichium barbigerum*, Gray, Syn. Fl. 194. Sat robusta, a basi ramosa; spicis elongatis. Calyces fructiferi majusculi, lin. 3–4 longi, subpedicellati, sepalis haud raro apice parum dilatatis. Corolla limbo lin. 1 vel 2 diametro. Nuculæ (1–2 vel 2–3 rarissime 4 fertiles) ovatæ, apice subacuminatæ, scabro-muricatæ, griseæ, sulco basi in areolam parvam triangularem desinente nec in furcam producto. — We have it only from the southern parts of California and the adjacent western part of Arizona. This and the two following species are either confluent or hard to define.

b. Sepala fructifera minora (lin. 2–3 longa), setis rigidis albidis seu flavescentibus hispida, cum vel sine pube brevi: corolla limbo lin. 1–3 lato: caulis passim 1–2-pedalis.

K. INTERMEDIA. *Eritrichium intermedium*, Gray, Proc. Am. Acad. xvii. 225. Nuculæ oblongo-ovatæ, pl. m. acuminatæ, crebre asperato-muricatæ, sulco latiusculo nunc fere ad apicem aperto. — Only in the southern part of California, from Los Angeles and San Diego to the Mohave district. There is a small-flowered and a larger-flowered form.

K. AMBIGUA. *Eritrichium muriculatum*, Torr. in Wilkes Exped. xvii. t. 13. *E. angustifolium*, Watson, Bot. King Exped. 241, non Torr. *E. muriculatum*, var. *ambiguum*, Gray, Syn. Fl. ii. 194. Nuculæ deltoideo-ovatæ, pl. m. acuminatæ, scabrido-muriculatæ, sulco sæpius inferne aperto basi divaricatim furcato. — Not uncommon from Southern California to Oregon, the interior of Washington Territory, Nevada, and apparently N. Arizona.

= = Calycis fructiferi ovalis vel oblongi sepala lanceolata, sesquilineam vel haud ultra lin. 2 longa, nuculas minus superantia; costa obscura, setis fulvis.

K. MURICULATA. *Myosotis muricata*, Hook. & Arn. Bot. Beech. 369. *Eritrichium muriculatum*, A. DC. Prodr. x. 132; Gray, l. c. Sat robusta, 1–2-pedalis, vel minor gracilior; cymis rite evolutis sæpius 2–3-radiatis, spicis densifloris; corollæ limbo lin. 1–2 lato; nuculis lineam longis circumscriptione deltoideo-ovatis obtusis vel acutiusculis scabro-muricatis, sulco tenui basi divaricato-furcato plerumque clauso. — Nearly throughout California, extending to Washington Territory. The plant of Douglas, on which the species was founded by Hooker and Arnott, is one of the stouter forms, too young for well making out the fruit. In Proc. Am. Acad. x. 59, I inadvertently took it to belong to *Plagiobothrys canescens*.

K. JONESII. Pedalis, gracilis; caule stricto cum ramulis brevibus spicigeris sæpius plurimis lateralibus racemoso-paniculatis; foliis parvis angusto-linearibus; calycibus fructiferis haud ultra sesquilineam longis setis paullo brevioribus armatis; nuculis ovato-trigonis obtusis (semilineam longis) aspero-muriculatis, sulco ventrali basi furcato clauso; stylo crassiusculo breviter exserto. — Bay of Monterey, California, at Soledad and at Santa Cruz, *Marcus E. Jones*, 1882. Lower California near the U. S. boundary, *C. R. Orcutt*, no. 1022, 1884. — Differs from the preceding, not only in the smaller size of the parts, but in the usual character of the inflorescence. Resembles rather Bertero's no. 1157 of Chili, *K. clandestina* (*Eritrichium clandestinum*, A. DC., &c.); but it has different nutlets and no cleistogamous flowers.

= = = Calyx fructifer vix lineam et nuculæ $\frac{1}{3}$-lineam longæ.

K. MICROMERES. *Eritrichium micromeres*, Gray, Proc. Am. Acad. xix. 90. *E. angustifolium*, Gray, Proc. Am. Acad. v. 165, non Torr., &c. Subpedalis, hispidula, erecta, diffuso-ramosa; foliis parvis; spicis filiformibus; floribus minimis; sepalis lanceolatis obtusiusculis; nuculis ovato-trigonis acutiusculis acutangulis nitidulis dorso muriculatis, faciebus internis sæpius concavis lævibus, sulco ventrali basi subito dilatato. — California, at Santa Cruz, *Marcus E. Jones*, 1881. Lower California at Cape San Lucas, *Xantus*, 1860.

++ ++ ++ ++ ++ *Trachycaryæ Sparsibracteatæ:* nuculæ breves, lato-trigonæ, dorso papillis sparsis muricatæ, intus areola sat magna triangulari gynobasi pyramidatæ acutæ adfixæ, supra medium liberæ, carina parum sulcata: stylus vix exsertus: spicæ pl. m. bracteatæ: calyx fructifer vix ultra-lineam longus, setis haud pungentibus breviusculis hispidus; sepalis lanceolatis, costa obscura: corolla minima: herbæ diffuso-ramosæ, humiles, Texano-Mexicanæ; foliis parvulis plerumque linearibus.

K. PUSILLA. *Eritrichium pusillum*, Torr. & Gray, Pacif. R. Rep. ii. 171. Hispidula, parvula, a basi diffusa; spicis elongatis densifloris bracteis minimis hinc inde instructis; nuculis nitidulis haud semilineam longis, dorso papilloso convexo, angulis lateralibus acutis, faciebus internis arcte concavis lævissimis, areola intrabasali deltoidea parum excavata. — Fine specimens of this well-marked species have been recently collected at Fort Davis, S. W. Texas, by *Dr. Girard.*

K. RAMOSA. *Lithospermum ramosum*, Lehm. Asperif. 328. *Myosotis albida*, HBK. Nov. Gen. & Spec. iii. 91. *Eritrichium ramosum*, A. DC. Prodr. x. 132. *E. hispidum*, Buckley in Proc. Acad. Philad.

1861, 492; Gray, Proc. Am. Acad. x. 59, & Syn. Fl. ii. 195. *E. heliotropioides*, Torr. Bot. Mex. Bound. 140, pro parte, excl. syn. *Amsinckiæ* spec., Benth. Pl. Hartw. no. 157. — Hispida, e caule sæpius erecto solute ramosa; spicis folioso-bracteatis, fructiferis laxifloris; nuculis ($\frac{2}{3}$ lin. longis) opacis obtuse papillatis lateribus rotundatis, areola insertionis triangulari ampla excavata. — As this species extends well into Mexico, and accords with both Lehmann's and Kunth's accounts (published in the same year), the specific name under which the former found it in Willdenow's herbarium is here restored. [This identification is confirmed by Dr. Eichler, through a reference to the original specimens of Humboldt in the Berlin herbarium.]

†† †† †† †† †† †† *Crebribracteatæ*, parvulæ, pube tenui: nuculæ ovato-lanceolatæ, acuminatæ (semilineam longæ), haud angulatæ, aut læves nitidulæ, aut minutim papilloso-scabræ et opacæ, sulco angustissimo inferne parum latiori tota longitudine gynobasi filiformi seu tenuiter columnari adfixæ: stylus sæpius incrassatus: sepala lato-lanceolata, fructifera lineam longa, haud setosa, costa obscura: spicæ breves, condensatæ, congestæ, bracteis foliosis flores superantibus.

K. MICRANTHA. *Eritrichium micranthum*, Torr. Bot. Mex. Bound. 141. Pube brevi griseo-hirsuta, limbo corollæ vix lineam lato.

Var. LEPIDA. *Eritrichium micranthum*, var. *lepidum*, Gray, Syn. Fl. ii. 193. Magis hispidula, limbo corollæ ad lin. $2\frac{1}{2}$ diametro. — The two forms are confluent. The nutlets of both at full maturity are more commonly covered with minute papillæ, but sometimes they retain their smoothness.

* * PIPTOCALYX, i. e. calyx (5-fidus, villoso-hispidus) supra basim fructum fulcrantem demum circumscissus et secedens: antheræ mucronulatæ: fructus *Eutypicarum*, nuculis ovato-acuminatis lævibus vel puncticulatis angulis lateralibus acutis sulco ventrali tenui basi divaricato-furcato tota fere longitudine gynobasi subulatæ adfixis: herba depresso-ramosissima, condensata; foliis brevibus linearibus; spicis etiam fructiferis brevibus glomeratis crebre folioso-bracteatis; corollis parvis. — *Piptocalyx*, Torr.

K. CIRCUMSCISSA. *Lithospermum circumscissum*, Hook. & Arn. Bot. Beech. 370. *Piptocalyx circumscissus*, Torr. in Wilkes Exped. xvii. 414, t. 12, B. *Eritrichium circumscissum*, Gray, Proc. Am. Acad. x. 58, Bot. Calif. i. 572, Syn. Fl. ii. 193. — Extends through the arid districts from Wyoming to Washington Territory, and south to Arizona.

§ 4. PTERYGIUM. Nuculæ *Eukrynitzkiæ* vel *Pseudokrynitzkiæ*, sed ala scariosa cinctæ, sive una exalata, gynobasi subulatæ usque ad apicem adfixæ, dorso granulato-scabræ vel muriculatæ: herbæ annuæ vel biennes, erectæ; corollæ tubo calyce haud longiore; spicis ebracteatis.

* Ala nucularum crenulata vel dentata nunc laciniata, lata, circumscriptione ovato-rotunda; vel nucula una quandoque exalata marginibus aut rotundatis aut acutiusculis: sepala ovato-lanceolata obtusiuscula.

K. PTEROCARYA. *Eritrichium pterocaryum*, Torr. in Wilkes Exped. xvii. 415, t. 13, B; Watson, Bot. King Exped. 245; Gray, Syn. Fl. ii. 195, cum var. PECTINATUM, forma ala nucularum pectinato-laciniata.

* * Ala integerrima, nucula haud latior, circumscriptione ovata: herbæ proceriores, rudes, aspero-hispidæ.

K. HOLOPTERA. *Eritrichium holopterum*, Gray, Proc. Am. Acad. xii. 81, & Syn. Fl. ii. 196. Pedalis et ultrapedalis, paniculato-ramosa, parviflora; foliis parum sesquipollicaribus linearibus. — Collected only by *Dr. Palmer*, in 1876, near Ehrenberg in Arizona, without mature fruit. A plant coll. by Dr. Palmer in 1877, at St. George, S. Utah, is in appearance between this and *K. oxygona*, with calyx silky-villous and apparently not bristly, the quite immature nutlets ovate-acute and narrowly winged.

K. SETOSISSIMA. *Eritrichium setosissimum*, Gray, l. c. Procera, bipedalis e radice bienni vel forte perenni, setis longis gracilibus hispidissima, sed foliis radicalibus (lanceolato-spathulatis cum petiolo nunc semipedalibus) pube molli canescentibus, setis fere nullis. Folia caulina lanceolata ad linearia, poll. 2–4 longa. Inflorescentia primum thyrsoideo-spicata, demum in spicis plurimis rigidis poll. 3–4 longis strictis racemoso-dispositis evoluta. Corolla limbo lin. 3 lato. Calyx fructifer lin. 4 longus, sepalis lanceolato-oblongis. Nuculæ homomorphæ, cum ala (utrinque ultra semilineam lata) ovales, lenticulares, sulco aperto insertæ. — Collected in Southern Utah and Northern Arizona, by *Ward*, *Palmer*, and *Rusby*. A remarkable and very coarse species, with much the habit of *K. glomerata*.

§ 5. PSEUDOKRYNITZKIA. Nuculæ triquetræ vel trigonæ angulis lateralibus acutatis, gynobasi plerumque subulatæ adfixæ: herbæ biennes vel perennes, paucæ annuæ; corolla fornicibus faucialibus prominulis vel exsertis et annulo 10-squamellato vel glanduloso supra basim tubi sæpius instructæ. — *Eritrichium*, § *Krynitzkia*, subsect. *Pseudo-Myosotis*, Gray, l. c., excl. spec. nuculis alatis.

* *Intermediæ*, ramosæ, parvifloræ, foliis parvis linearibus, *Eukrynitzkiis* nimis affines.

+– Annua, cymis pedunculatis sæpius bi–tri-radiatis, spicis confertifloris brevibus ebracteatis.

K. OXYGONA. *Eritrichium oxygonum*, Gray, Proc. Am. Acad. xix. 89. Facie et calyce *K. pterocaryæ* sat similis, nuculis nisi acutangulis *Typicarum*. Nuculæ paullo ultra lineam longæ, dorso parce minuteque muriculatæ, nunc fere læves nitidulæ, circumscriptione angusto-deltoideæ, sensim acutæ, angulis lateralibus acutatis, ventrali obtuso, sulco angusto basi furcato clauso tota longitudine gynobasi gracili adfixæ. Corolla limbo lin. 2 lato. — Collected by *Mr. Pringle* on the borders of the Mohave Desert in 1882, and again by *Mrs. Layne-Curran* in 1884.

+– +– Basi demum lignescente perennans, paniculato-ramosissima, floribus parvis sparsis sæpe foliis fulcratis.

K. RAMOSISSIMA. *Eritrichium racemosum*, Watson in herb. Gray, Proc. Am. Acad. xvii. 226. Folia parva, cum calycibus angustis setis rigidis asperata. Nucula plerumque solitaria, tenuis, oblongo-lanceolata, scabrella, nitida. — This proves to be a rather widely spread species on the southern borders of California. It was described from a specimen collected by the Brothers *Parish* in San Bernardino Co.; has now been found in the Mohave Desert by *Mrs. Layne-Curran*, and at Point Loma and the Cantilas range on the borders of Lower California by *Mr. Orcutt;* also on Santa Catalina Island by *W. S. Lyon*. Moreover, it may now be identified with incomplete specimens collected on Cedros Island by the late *Dr. Veatch*, and on Guadalupe Island by *Dr. Palmer;* the latter wrongly referred to *Eritrichium angustifolium*. The specific name which it bore under *Eritrichium* I have replaced by a much fitter one. It was not very appropriate for the described specimen, and is still less so for those which have quite sessile or scattered flowers.

* * *Glomeratæ*, sat robustæ, e radice valida perenni vel bienni; foliis plerumque latiusculis; floribus thyrsoideo-congestis mediocribus (corolla limbo lin. 3–4 lato) hinc inde bracteatis. (Flores in nonnullis heterogono-dimorphi: stylus crassiusculus.)

The final species of this division are too widely different from true *Krynitzkia*. It might be more satisfactory to found a genus for all the following, along with *K. setosissima* (referred elsewhere on account of its decidedly winged nutlets); but the various intermediate forms forbid the taking of that course. Some tendency to heterogone dimor-

phism in the whole group is to be suspected, at least in the length of the style. For the last two species this is manifest, but sometimes low stamens are accompanied by a still lower style.*

+– Fructus (e nuculis 4 acutangulis dorso rotundatis arcte conniventibus) depresso-globosus: perennes, multicaules.

K. JAMESII. *Myosotis suffruticosa*, Torr. in Ann. Lyc. N. Y. ii. 225. *Eritrichium Jamesii* & *E. multicaule*, Torr. Bot. Mex. Bound. 140, & Marcy Rep. 294. Canescens pube adpressa molli, denique pl. m. hirsuta vel molliter hispida; caulibus brevibus decumbentibus nunc demum erectis subpedalibus; foliis obtusis oblanceolatis ad fere lineares; glomerulis demum in spicas evolutis; sepalis lanceolatis; corolla subrotata, tubo calycem haud superante lobis parum longiore, fornicibus exsertis oblongis; antheris oblongis fauci insertis; nuculis lævissimis, singulis $\frac{1}{4}$ globi depressi. — Sometimes decidedly hispid in age, sometimes canescent only with a soft and close pubescence. In the latter form it extends westward into San Bernardino Co., California, coll. *Parish.*

K. PALMERI. *Eritrichium fulvocanescens*, Watson, Proc. Am. Acad. xviii. 121, non Gray. Humilis; foliis angusto-linearibus pube strigoso-hirsuta canescentibus; caulibus calycibusque pilis patentibus hirsutissimis; corolla angusta, tubo sepala lineari-lanceolata vix superante lobis (parvulis) plus duplo longiore, fornicibus subglobosis; antheris fere linearibus; nuculis opacis rugosiusculis. — Coahuila, Mexico, forty miles south of Saltillo, *Dr. Palmer*, March, 1880, no. 895 of the distribution.

+– +– Fructus pl. m. pyramidatus; nuculis dorso convexiusculis vel planis.

++ *Breviflorœ*, i. e. corolla tubo calycem haud superante limbo suo (diametro lin. 2–3$\frac{1}{2}$ lato) breviore, fornicibus faucialibus semiglobosis paullo exsertis: antheræ oblongæ: sepala lanceolata: nuculæ ovatæ pl. m. obcompressæ, dorso saltem scabro vel tuberculato, angulis lateralibus marginato-acutissimis, ventre parum elevato sulco tenui basi in areolam desinente percurso.

= Setis longis patentissimis hispidissimæ, semipedales ad 2–3-pedales e radice bienni.

* *Myosotis grandiflora*, HBK., would seem from the figure to be of this group, if it came from Mexico ("in monte Orizaba, *Sch.* & *Deppe*," ex DC. Prodr.), and not from the Quitensian Andes. May not the latter habitat come from a transposition of the two species of *Myosotis* in the Nov. Gen. & Spec. ?

K. VIRGATA. *Eritrichium virgatum*, Porter in Hayden Geol. Rep. 1870, 479. *E. glomeratum*, Gray, Am. Jour. Sci. ser. 2, xxxiv. 225, non DC. *E. glomeratum*, var. *virgatum*, Porter & Coulter, Fl. Colorad. 102. Hispida, haud canescens; caule simplicissimo cum thyrso angustissimo stricto (sæpius ultrapedali) foliato demum 2–3-pedali; cymulis etiam fructiferis perbrevibus foliis fulcrantibus angusto-linearibus brevioribus; foliis caulinis inferioribus radicalibusque angustissime spathulatis; corollæ limbo lin. 2 lato, fornicibus latioribus quam longis; nuculis vix ultra sequilineam longis lato-ovatis obtusis sæpe nitidulis dorso parce papillosis cæterum lævibus. — This we have only from the eastern slopes of the Rocky Mountains in Colorado, and it does appear to be a distinct species. The slender leaves subtending the cymes of the virgate thyrsus are an inch or two long, all but the uppermost several times longer than the flower-clusters.

K. GLOMERATA. *Cynoglossum glomeratum*, Pursh, Fl. ii. 729. *Myosotis glomerata*, Nutt. Gen. i. 112; Hook. Fl. Bor.-Am. ii. t. 162. *Rochelia glomerata*, Torr. Ann. Lyc. N. Y. ii. 225. *Eritrichium glomeratum*, DC. Prodr. x. 131; Porter & Coulter, Fl. Colorad. 102. *E. glomeratum*, var. *hispidissimum*, Torr. Bot. Mex. Bound. 140. Valde hispida; caule (cum thyrso oblongo interrupto demum aperto et in spicis fructiferis folia multo superantibus evoluto) semipedali ad sesquipedalem; foliis plerisque spathulatis, radicalibus saltem pube minuta inter setas basi demum papillosas pl. m. canescentibus; corolla limbo 2–3½ lin. lato, fornicibus æquilongis ac latis; nuculis crassioribus 1½–2 lin. longis ovatis versus apicem obtusiusculum angustatis, dorso pl. m. corrugato. — This belongs rather to the plains along the eastern base of the Rocky Mountains, from Saskatchewan to New Mexico, but extends westward to the interior of Washington Territory, and to northern parts of Arizona. It occurs both with short and with longer style.

= = Minus hispida, nana, multicaulis e caudice perenni; foliis saltem radicalibus pube molli strigoso-sericea incanis cum setis parum rigidis breviusculis plerumque incumbentibus: thyrsus etiam fructifer spiciformis: corolla lin. 2–3 lata.

K. SERICEA. *Eritrichium glomeratum*, var. *humile*, Gray, Proc. Am. Acad. x. 61, & Fl. l. c., magna parte. Nuculæ oblongo-ovatæ, obtusæ, obcompressæ, dorso subrugoso-tuberculatæ. — Alpine and subalpine, on mountains from Colorado and Utah to Oregon and Montana, and probably in the British Possessions. There are less canescent specimens from the Saskatchewan region and also from the higher Sierra Nevada (and uncertain as to the duration of the root) which

may belong either to this species or to dwarfed forms of the foregoing. I have adopted one of the two specific names under which this species occurs in Nuttall's collections.

++ ++ *Longifloræ*, i. e. corolla tubo (lin. 4–6 longo) calycem pl. m. superante limbo suo 2–4-plo longiore, fornicibus erectis elongatis (oblongis seu lanceolatis): antheræ sublineares: sepala mox elongato-linearia: styli elongati: nuculæ intus pl. m. carinatæ, a basi ultra medium usque gynobasi subulatæ adfixæ: herbæ perennes, erectæ, multicaules; caulibus superne cum thyrso spiciformi interrupto tantum villoso-hispidis; foliis præsertim radicalibus pube adpressa pl. m. incanis. Flores heterogono-dimorphi.

K. FULVOCANESCENS. *Eritrichium fulvocanescens*, Gray, Syn. Fl. ii. 197. *E. glomeratum*, pro parte, and var.? *fulvocanescens*, Watson, Bot. King Exped. 243. Spithamæa ad semipedalem, cæspitosa; foliis spathulatis nunc fere linearibus; corollæ tubo lin. 4 longo; nuculis ovatis acutiusculis opacis dorso pl. m. papillosis vel tuberculato-rugosis. — Mountains of New Mexico and adjacent borders of Texas to those of Nevada, Wyoming, &c.

K. LEUCOPHÆA. *Myosotis leucophæa*, Dougl. in Lehm. Pugill. & Hook. Fl. Bor.-Am. ii. 82, t. 163. *Eritrichium* (*Pseudo-Myosotis*) *leucophæum*, A. DC. Prodr. x. 129. Pedalis et ultra; foliis lanceolato-spathulatis nunc fere linearibus; corollæ tubo lin. 5–6 longo intus parum annulato; nuculis triquetris circumscriptione ovatis lævissimis nitidis. — Dry interior region, from Brit. Columbia to S. Utah and S. E. California. Probably the corollas are never yellow. The only indication of it is on a ticket of specimens gathered by Prof. Brewer near Lake Mono, about which there may be a mistake. The older corollas of it appear to have turned brownish, as they are said to do in the preceding species.*

* KRYNITZKIA PHACELIOIDES, Fisch. & Meyer, is cited by Philippi, Cat. Pl. Chil. 211, as a synonym of *Eritrichium phacelioides*, Clos in Gay, Fl. Chil. iv. 468, t. 52 bis. By the figure the plant seems to have an annual root and marginless nutlets; so that it is probably a *Eukrynitzkia*, but with the habit of

K. ALYSSOIDES, *E.? alyssoides*, DC. Prodr. x. 131, which would seem to include *E. gnaphalioides*, A. DC. l. c., a suffrutescent perennial, perhaps also *E. Gilliesii*, Phil., at least Reed's plant so named, and to be referred to *Pseudokrynitzkia*.

K. CLANDESTINA (*Eritrichium*, A. DC.) has already been referred to (p. 274), and it may have some earlier and better specific name. This may also be the case with *E. cryptanthum*, A. DC.

K. LINEARIS, *Myosotis linearis*, Colla, Act. Taur. xxxviii. 126, t. 42 (*Eritrichium*, DC.), an annual, has acute-edged nutlets which may refer it to the neighborhood of *K. oxygona*.

These are Chilian species, and there are many more in the books.

PLAGIOBOTHRYS, Fisch. & Meyer, nunc maxime ampliatus.*

Calyx, corolla, stamina, etc. *Krynitzkiæ.* Nuculæ lato-ovatæ vel subtrigonæ, sæpius incurvæ, crustaceæ vel coriaceæ, dorso convexo rugosæ vel asperatæ, rarissime læves, aut erecto-incumbentes, aut 2 vel 3 abortientibus succumbenti-horizontales, intus versus apicem carinatæ, versus (nunc infra raro supra) medium per pseudo-carunculam (perforatam vel solidam) gynobasi latæ adfixæ, dum secedentes foveas vel areolas depressas totidem in gynobasi nudantes. — Herbæ annuæ, Occidentali-Americanæ, humiles, sæpius diffusæ, corolla alba in plurimis parva. — *Plagiobothrys*, Fisch. & Meyer, Ind. Sem. Hort. Petrop. ii. (1835) 46, & A. DC. Prodr. x. 134; spec. typica solum. *Eritrichium* § *Plagiobothrys*, Gray, Proc. Am. Acad. x. 57, Syn. Fl. ii. 191, & Proc. Am. Acad. xvii. 226.

* AMBIGUI: gynobasis oblongo-pyramidata, foveis vel fossis nuculiferis elongatis ovato-oblongis seu lineari-oblongis exarata: caruncula angusta, subcarinæformis, trientem nuculæ longitudine subæquans: pubes hispido-hirsuta: flores mediocres, corollæ fere rotatæ limbo lin. 3–4 lato.

P. KINGII. *Eritrichium Kingii*, Watson, Bot. King Exped. 243, t. 23; Gray, Syn. Fl. ii. 192, maxima parte. — Eastern side of the Sierra Nevada at Truckee Pass, &c., California (first coll. by *Watson*), and adjacent borders of Nevada, *Lemmon*, *Mrs. Layne-Curran*, by the last two at length with mature fruit.

* * GENUINI: gynobasis subglobosa vel convexa: nuculæ reticulato-rugosæ vel muriculatæ, raro lævigatæ, pseudo-caruncula aut annulari aut strumæformi (nec stipitiformi) pl. m. indurata arcte persistente instructæ, tarde secedentes, areolas depressas totidem orbiculatas in gynobasi relinquentes: flores aut pseudo-spicati nudi, aut rarius glomerati: pubes mollis (villosa vel hirsuta) necnon cum setis debilibus e basi papillosa ortis in foliis inferioribus.

* *Plagiobothrus* was evidently intended, *βόθρος* being the word for pit or hollow, and there is no Greek word answering to *bothrys*. Although we may not correct the form of the name, we must hold to the masculine gender. Although the name, in its original application to the hollow in the face of the nutlet, is good only for the single original species, it is not far amiss for the others also, in view of the hollows left on the gynobase after the nutlets fall. These are shallow pits or depressions, or areolæ with raised borders, orbicular or nearly so except in the first species, in two or three of them with the borders so thickened or salient that the gynobase after the nutlets fall is cruciform when all four nutlets mature. More commonly only one or two nutlets ripen.

+ *Typici, Perforati:* nuculæ parum incurvæ, dorso lato convexo angustissime carinatæ, intus supra basim in pseudo-umbilicum profundum caruncula depressa annuliformi marginatum excavatæ: herbæ laxæ, graciles; spicis vel racemis cymæ uni- vel bipari demum elongatis sparsifloris fere ebracteatis; calyce alte 5-partito laxe erecto persistente. — *Plagiobothrys*, Fisch. & Meyer, & DC. Prodr. l. c.

P. RUFESCENS, Fisch. & Meyer, l. c., A. DC. l. c. *Myosotis alba*, Colla, Act. Taur. (Pl. Bert. no. 88), fide A. DC. *M. fulva*, Hook. & Arn., Bot. Beech. 38, non 369. *Eritrichium fulvum*, A. DC. Prodr. x. 132; Gray, Proc. Am. Acad. xvii. 226. — Chili, *Bertero*, *Bridges*, and others. W. California on the border of Oregon, *Howell*, and in Colusa and El Dorado Counties, *Mrs. Layne-Curran*, 1884. Also near Los Angeles, coll. *J. C. Nevin*, 1882, recently received. Only in the North American specimens which have now happily come to hand, first from Mr. Howell and then from Mrs. Layne-Curran, have I mature fruit, verifying the original character. But I am now able to verify it on a specimen of Bertero's no. 443, immature though it be. The mature nutlets in the Californian plant are from a line and a half to two lines long. Their size is not mentioned by Fischer and Meyer; by De Candolle they are said to be hardly over a line in length; probably not well grown in the cultivated plant. Neither of the authorities mentions the narrow keel on their back. Their form, "illis *Echii* subsimilis," is well given by the founders of the genus; also the "rugosa, tuberculata" by them, and the reference of this to the inner side of the nutlet by De Candolle. There is considerable variation in these respects, as well as in the texture of the pericarp, which commonly becomes cartilagineous or thin-crustaceous, the back either rugose with slender and elevated transverse wrinkles, and with or without minute papillæ in the interspaces, or with these and no rugosity, or with both obsolete. The keel and an obscure or manifest acute crest or angle on each side, between the back and inner face, are sometimes almost entire, sometimes denticulate or even muriculate, as are the sharp ventral rugæ. The "strophiole," or as I prefer to call it the (false) caruncle, is well developed in all mature fruit as a tumid ring around the orbicular cavity. It is never left behind on the gynobase, as De Candolle describes: what was taken for such may be the thickened and projecting portions of the gynobase between the insertions, which are in the hollows. These hollows when fresh are more or less umbonate, the umbo fitting into the round and ample cavity of the nutlet. The caruncular ring is complete, but the basal side is thicker than the

upper, where it connects with the narrow and salient ventral carina. There is hardly a doubt of the essential identity of the Californian with the Chilian species, although mature specimens of the latter are to be desired. And it is most probable that it is indigenous to both regions.

+– +– *Scutellati:* nuculæ fere rectæ, intus supra basim caruncula ovato-deltoidea applanata scutelliformi sub centro pervio vix excavata instructæ: folia inferiora opposita.

P. PROCUMBENS. *Eritrichium procumbens*, DC. Prodr. x. 133 (*Myosotis procumbens*, Colla, l. c., ex DC.); Pl. Chili, Bertero, no. 145. A slender little plant, which, by the well-developed caruncle (the centre of which is perforate, although the nutlet is hardly at all excavated underneath it) apparently should belong to this genus, rather than to *Krynitzkia*. The nutlet is little over half a line in length.

+– +– +– *Imperforati:* nuculæ magis incurvæ, medio-fixæ, ad insertionem haud excavatæ, caruncula parvula imperforata strumæformi vel linguæformi instructæ: gynobasis parva, vix hemisphærica.

++ Chilensis, tenellus, "papyros violaceo colore tingens" (Ruiz & Pavon), microcarpus.

P. TINCTORIUS. *Lithospermum tinctorium*, Ruiz & Pav. Fl. Per. ii. 4, t. 114. *L. tingens*, Lehm. *Eritrichium tinctorium*, A. DC. Prodr. x. 132.

++ ++ Amer. Bor.-Occidentales.

= Nuculæ maturæ intus concavæ, basi apiceque abrupte contractis quasi cruciatim quadrilobæ, vitreo-crustaceæ, nitidulæ, dorso transversim lineato-rugosæ, nempe lineis rectis angustissimis impressis inter rugas latas a marginibus subcristatis ad carinam parum elevatam percursæ: herbæ parvulæ, erectæ; calyce alte 5-fido persistente vel sero juxta basim imperfecte circumscisso, lobis lato-lanceolatis pube primum rufescente demum fulva villosis.

P. TENELLUS. *Myosotis* (*Dasymorpha*) *tenella*, Nutt. in Hook. Kew Jour. Bot. v. 295. *Eritrichium tenellum*, Gray, Proc. Am. Acad. x. 57, & Syn. Fl. ii. 192. *E. fulvum*, Watson, etc., non A. DC. Calyx fructifer lin. 2 longus. Nuculæ lineam longæ, insigniter quadrilobæ (basi fere ut apice contracta), pl. m. muriculato-asperatæ. — Not uncommon from British Columbia east to Idaho and south to San Bernardino Co., California, chiefly in the western part of the interior region.

P. SHASTENSIS, Greene in herb. Flores majores; calyce fructifero lin. 3 longo; nuculis sesquilineam longis lævibus vel ad margines tantum muriculatis. — California, in valley at the base of Mount Shasta, *E. L. Greene*, coll. 1876. Perhaps only a variety of the preceding, the calyx of which sometimes approaches this in size.

= = Nuculæ lato-ovatæ, haud cruciatæ,

a. Vitreo-crustaceæ, vix nitidulæ, obcompressæ, dorso vix carinato lineis angustissimis impressis inter rugas latas rectas transversim percursæ: caules mox ramosi, diffuso-procumbentes, cum foliis oblongis (superioribus flores fulcrantibus) hispidulo-hirsuti, papyros herbarii violaceo colore tingentes: calyx haud circumscissus.

P. TORREYI. *Eritrichium Torreyi*, Gray, l. c. — In the Yosemite Valley and vicinity; coll. only by *Torrey* and *Lemmon*.

b. Nuculæ opacæ, nec vitreæ, nec indurato-crustaceæ, dorso parum carinato rugis sparsis angustis prominentibus subreticulatis areolas multo majores circumscribentibus instructæ, sæpeque minutim granulatæ.

1. Calyx 5-partitus vel profunde 5-fidus, sero juxta basim circumscissus vel persistens: spicæ sæpissime simplices (i. e. cymæ uniparæ), hinc inde foliatæ, irregulares: herbæ sæpius a basi ramosæ et diffusæ; corolla limbo parvo.

P. ARIZONICUS, Greene in herb. *Eritrichium canescens*, var. *Arizonicum*, Gray, Proc. Am. Acad. xvii. 227. Hirsutus, subhispidus pilis patentissimis, nunquam canescens, facie præcedenti subsimilis, foliis angustioribus. Calyces fructiferi haud ultra lin. 2 longi, segmentis sæpius supra fructum conniventibus, basi demum circumscissi. Nuculæ maturæ subcrustaceæ, nunc albescentes, rugis acutissimis nunc tuberculis minimis paucis instructis. — Arizona and adjacent borders of Utah, coll. *Greene*, *Palmer*, *Lemmon*, *Pringle*, *Parish*, &c. This apparently quite distinct species has been variously distributed under the names of *Eritrichium canescens* and *E. fulvum*, which in different forms it most resembles.

P. CANESCENS, Benth. Pl. Hartw. 326. *Eritrichium canescens*, Gray, l. c. Pilis mollioribus villoso-pubescens, subcanescens. Calyces fructiferi lin. 2–3 longi, aut laxe erecti aut patenti-aperti, persistentes, raro imperfecte circumscissi. Nuculæ rugis obtusioribus. — California, from the valley of the Sacramento to Los Angeles and San Bernardino, apparently first collected by *Hartweg*. Varies in the degree of accrescence of the calyx, which in the same plant may be either loosely open or erect, or with the lobes somewhat connivent.

2. Calyx a medio tantum 5-fidus, sesquilineam longus, pube primum rufa demum fulva seu albida sericeo-villosa; fructifer parum accrescens lobis conniventibus, mox supra basim circumscissus nuculas semi-nudans: corolla inter affines insignis, limbo rotato 5-lobo ad lin. 4 diametro: caules erecti, semi- ad bi-pedales, graciles, cum foliis viridibus parce hirsuti vel pubescentes: spicæ cymæ nudæ sæpius conjugatæ vel quasi paniculatæ, demum elongatæ et graciles, ebracteatæ.

P. NOTHOFULVUS. *Myosotis fulva*, Hook. Fl. Bor.-Am., pro parte, & Bot. Beech. 369, non Hook. & Arn. Bot. Beech. 38. *Eritrichium fulvum* (A. DC. Prodr. l. c. quoad Pl. Calif.), Gray, Proc. Am. Acad. x. 57, & Syn. Fl., excl. syn., etc. *E. nothofulvum*, Gray, Proc. Am. Acad. xvii. 227. *Bothriospermi?* sp., Benth. Pl. Hartw., l. c. no. 1873. — Common throughout California and north to Washington Territory.

* * * STIPITATI: nuculæ rectiusculæ, obliquæ, gynobasi depressæ ope pseudo-carunculam pl. m. stipitiformem induratam adfixæ; areolæ gynobasis orbiculatæ parvulæ: herbæ humiles, e radice annua ramosissimæ, mox prostratæ; calyce profunde 5-partito, fructifero persistente. *Echidiocaryæ* spec., Gray, Proc. Am. Acad. xii. 164, & Syn. Fl. ii. 199.

P. URSINUS. *Echidiocarya ursina*, Gray, Proc. Am. Acad. xix. 90. Cæspitanti-depressus, undique hispidus, foliosissimus; foliis aut spathulatis aut superioribus flores pleros sæpe glomeratos fulcrantibus oblongis; corolla calycem vix superante, limbo parvo; nuculis tenuiter parciterque rugoso-reticulatis lævibus, caruncula brevi. — S. California, in Bear Valley of the San Bernardino Mountains, *Parish Brothers*, and northern confines of Lower California, *C. R. Orcutt*. Some slight papillosities are occasionally developed on the sides of the nutlets.

P. COOPERI. *Echidiocarya Californica*, Gray, Proc. Am. Acad. xii. 164, etc. Laxe diffuso-ramosus, hispidulus vel hirsutus; ramis gracilibus sparsifoliis demum sparsifloris; foliis angustioribus; floribus plerisque ebracteatis; corollæ limbo expanso lin. 2–3 lato; nuculis magis trigonis reticulato-rugosis, rugis acutis hinc inde dentato-muriculatis, caruncula stipitiformi porrecta. — Southern California, common around San Diego and eastward, first coll. by *Cooper*, later by *Parry*, *Lemmon*, *Cleveland*, *Orcutt*, &c., and within the borders of Lower California by *Parry* and *Pringle*. The stipe-like caruncle is variable in length. The comparatively recent discovery of the preceding

species of this section has made it clear that both of them should fall into *Plagiobothrys*, a genus now shown to comprise a good number of species, and considerable diversity in the form and texture of the caruncle-like body by which the nutlets are attached to the gynobase.

* * * * ANOMALI: nuculæ rectiusculæ, nec rugosæ nec muricatæ, medio vel supra medium areolis orbiculatis gynobasis depressæ adfixæ, pseudo-caruncula præmolli minus persistente: herbæ (Sierra-Nevadenses) diffusæ, ramosissimæ, rudes, hispidæ; caulibus ad apicem usque foliatis; floribus semper glomeratis foliis (superioribus latioribus basi lata arcte sessilibus) fulcratis; calycibus 5-partitis, fructiferis apertis cum pedicellis brevissimis diu persistentibus.

The first of these species would pass unquestioned for a *Plagiobothrys* of a coarser sort, with the habit of *P. Torreyi* and *P. ursinus*. The second, of similar aspect, is more anomalous in the smooth and somewhat polished nutlets, with insertion well above the middle. The insertion in both is by a small and depressed central umbo, which fits into the very shallow round areola on the gynobase, the low margins of which are continuous with the soft-fleshy annulus or collar (so soft as to become pultaceous in hot water), which goes with the nutlet when this falls away, and forms a scale-like caruncle, of variable outline, and easily broken up. For both these species we are indebted to the same zealous and sharp-sighted botanist.

P. HISPIDUS. Semipedalis; foliis inferioribus lineari- vel angusto-spathulatis, superioribus oblongis (vix semipollicaribus, flores superantibus; nuculis turgide ovatis acutis dorso leviter obtuseque carinatis undique subpapilloso-granulatis opacis medio vel paullo supra medium insertis. — Truckee, on the eastern border of California, *Mrs. Layne-Curran*, 1884.

P. GLOMERATUS. Validior; foliis latioribus sæpius ovato-oblongis; nuculis nitidis fere lævibus ovali-ovatis minus turgidis (paullulum obcompressis) dorso convexiusculo haud carinatis intus inter medium et apicem insertis. — Western part of Nevada, between Carson and Virginia City, 1883 and 1884, *Mrs. Layne-Curran.*

ECHIDIOCARYA, reduced to the typical species, E. ARIZONICA, reverts to the original character in Proc. Am. Acad. xi. 89, and Benth. & Hook. Gen. Pl. ii. 854, *E. Californica* and *E. ursina* being now referred to a subdivision of *Plagiobothrys.*

2. *Notes on some American Species of Utricularia.*

These notes were suggested by an inspection of the colored drawings which were prepared by Major John Le Conte to illustrate his "Observations on the North American Species of the Genus Utricularia," which was published in the year 1824 in the first volume of the Annals of the Lyceum of Natural History, New York, pp. 72–79. Only rude outlines of the flowers, copied from these colored drawings, were published in this paper. After the death of Major Le Conte, the original drawings for this paper, along with those of his corresponding papers upon *Viola* and *Gratiola*, came into the possession of Mr. I. C. Martindale, in whose careful hands these interesting data are likely to be preserved, as they ought to be. Mr. Martindale obligingly lent them to me at a time when I was led to believe that Le Conte's *Utricularia personata* had been wrongly combined with the *U. cornuta* of Michaux.

Major Le Conte, in his memoir upon the genus, insisted that he had never seen *Utricularia cornuta* of Michaux; but his *U. personata* is said to inhabit bogs from New England to Florida, a district over which *U. cornuta* abounds, extending quite to the northern parts of Canada. It seemed certain, therefore, that he had unwittingly included *U. cornuta* in his *U. personata*, although the characters of flowers racemed, and lower lip of corolla small, showed that he had in view a Southern form to which these particulars apply. So we had admitted only one species of this peculiar group, allowing it to be quite variable; and Benjamin (in Linnæa, xx. 305, and in Mart. Fl. Bras. x. 240) did the same, referring to *U. cornuta* not only *U. personata*, but *U. juncea* of Vahl, a native of Guiana. But there is a small flowered racemose form in the Southern Atlantic States which one cannot without much forcing combine with the large- and few-flowered *U. cornuta*. And now Le Conte's original drawings for *U. personata* are found to represent the small-flowered form in question. His drawing is of a plant bearing seven racemosely scattered flowers, with corolla not over four lines long, and the spur filiform. Although we have no specimens from Brazil or Guiana, I judge that this form does extend to these countries, and that it is the *U. juncea* of Vahl, a name to be retained. From C. Wright's Cuban collection it appears that both this and the true *U. cornuta* are in Cuba. One can hardly draw up a clear diagnosis; but the following may serve.

U. CORNUTA, Michx. Stem 1–5-flowered, the flowers approximate at summit: lips of the corolla half-inch long; lower with the two sides

fully as broad as the large palate; spur subulate, as long as the lower lip, porrect or descending. — Northern Canada and Lake Superior to Texas; also Tropical American.

U. JUNCEA, Vahl. Stem racemosely or rather spicately 4–10-flowered, the lower flowers more or less distant: lips of the corolla 3 or 4 lines long, lower in large part consisting of the high-arched palate; spur slender-subulate, at length deflexed. — *U. personata*, Le Conte in Ell. Sk. i. 23, & Ann. Lyc. N. Y. i. 77, 78. — N. Carolina in the low country, through to Texas; also Cuba to Brazil. In both species the obovate upper lip of the corolla may be either emarginate or quite entire, and the lower either abruptly short-pointed or truncate-emarginate.

I proceed to make some notes upon the other drawings which were to illustrate Le Conte's monograph.

"U. CERATOPHYLLA." A full and good figure of *U. inflata*, Walt.

"U. MACRORHIZA." In the figure the spur of the corolla equals the lower lip in length, is contracted between the middle and the base, the apical portion narrow and moderately curved upward, and the apex is emarginate. The outline in the monograph is a correct copy of the outlines of one of the two flowers represented in the drawing. Le Conte's description of it, "conic at the base, linear at the tip," appears to have been made from the figure. If this well corresponded with the American plant, one would not hesitate to agree with him that his *U. macrorhiza* is quite distinct from *U. vulgaris*, not adopting, however, his strong assertion, "that no stretch of the imagination can find any resemblance between them further than what is seen running through the whole genus." Of course he was wrong in supposing that "the *U. vulgaris* has not the fruit cernuous," as much so as has the American plant. As to the spur in our American plant, the emargination is certainly uncommon; the tapering is gradual from base to tip; and it is only in the length and consequent slenderness that the American form obviously differs from the European. No known American specimens have the short and truly conical dependent spur of the old figures, such as those of Schkuhr's Handbuch and the original and later editions of the English Botany; but those of Cosson's Atlas and Reichenbach's Icones Floræ Germanicæ answer well for our plant, except that the spur in ours is commonly (but not always) longer, yet seldom more so, or more curved, than in fig. 7 of Reichenbach's tab. 1823 (202). The proportions of the palate to the lamina of the lower lip in *U. vulgaris*, var. *Americana*, as well in Le Conte's figure as in our specimens, are rather those of *U. neglecta*, Lehm., or *U. major*,

Schmidel and Reichenbach. If that be taken for a variety of *U. vulgaris*, all the more should the *U. macrorhiza* of Le Conte, an extreme form of the common N. American species. I have never seen a spur of the latter so long in proportion and so abruptly contracted as in Le Conte's figure.

"U. STRIATA." The drawing bears the name of "*U. biflora*, Vahl," which in the monograph this is thought probably to be. A diagnosis written in pencil under the figure seems to identify it with *U. striata*, and begins with "caule bi–trifloro." The published character in the monograph says "5–6-flowered," which is certainly wrong. The figure has only two flowers, on a stem barely a span high, which is smaller than usual. It represents the species which has been always taken for *U. striata*, and which is referred in the Synoptical Flora to *U. fibrosa*, Walt. But the outline of the flower in the monograph (fig. 4) is not taken from the drawing, nor from any figure in the collection, and the spur in the two does not quite correspond. So that the identification is rather doubtful.

"U. GIBBA." From the drawing (6-flowered) and the description (4–7-flowered), this should be *U. minor*, L., except that the proportion of the parts of the corolla is that of *U. gibba*.

"U. FORNICATA." The drawing which I suppose to represent this species bears no name. It is obviously *U. gibba*, L.

"U. LONGIROSTRIS" obviously represents the species which I take for *U. biflora*, Lam. This name should therefore in the Flora be made a synonym of that species, and be excluded from *U. fibrosa*.

"U. INTEGRA," from the drawing (if rightly identified, for it is without name), as well as from the description, I judge to be specifically the same as the last preceding, the spur rather stouter. Only the tip of it is represented in fig. 8 of the monograph.

"U. PURPUREA." It is the large-flowered form that is represented, probably from New Jersey.

"U. PERSONATA." *Vide supra.*

"U. SETACEA." The *U. subulata*, L., of which it is said that "nothing worthy the name of a description exists." This is true as to Gronovius and Linnæus. Both were evidently puzzled by Clayton's "Pyrola floribus albis spicatis," etc., which somehow or other got affixed to this *Utricularia* in the manuscript.

U. CORNUTA, Michx., is barely enumerated in the monograph, but not figured, having been confounded with *U. personata*. *Vide supra.*

Two other tropical species claim a place in our flora, having been detected in Florida.

U. LONGECILIATA, A. DC., is already in the published lists. It is a well-marked little species of Brazil, Guiana, and Cuba; it was collected by the late Dr. Garber in Florida, at Tampa and at Manatee, in 1877, but it did not reach me in time to be included in the first part of the Synoptical Flora.

U. SIMPLEX, C. Wright in Wright & Sauvalle, Flora Cubana, a small and spicately several-flowered species (which may have some earlier name), was collected by Miss Mary C. Reynolds at St. Augustine, Florida, in the autumn of 1879.

U. SUBULATA, L., var. CLEISTOGAMA, seems to be not uncommon. The late Dr. Garber collected it in Florida, and Mrs. Owen sends it from the island of Nantucket.

U. PURPUREA, Walt. In the Synoptical Flora it was questioned whether the plant there described is the species of Walter, on account of his "floribus parvis," those of the plant in view being "over half-inch broad," and the lips being spreading. My character was from Northern specimens. I had some from Georgia and S. Carolina, of a more slender plant with smaller flowers, which were thought to be imperfectly developed. But Mr. Curtiss has since sent fine specimens, answering to Walter's character, and to that of Chapman, who gives the breadth of the flower at four lines. At the same time he sends from Eastern Florida specimens exactly like the robust and larger-flowered plant of the Northern States. Wright's Cuban specimens seem to be intermediate. It remains to be determined whether the *U. saccata* of Elliott (the name of which Le Conte ignores) is the large or the small-flowered species, and whether fresh flowers of the two would furnish distinctive characters. If so, names for the two species are ready. The plant mentioned in Ell. Sk. i. 24, as probably the *U. purpurea* of Walter, must rather have been a purplish-flowered *U. subulata*. Walter evidently had a floating species in view.

3. *New Genera of Arizona, California, and their Mexican Borders, and two additional Species of Asclepiadaceæ.*

The character of the first of these genera has already been printed in the Bulletin of the California Academy of Sciences, 1884, no. 1, p. 4.

VEATCHIA, Nov. Gen. *Anacardiacearum.*

Flores dioici; ♂ ignoti. ♀ Sepala 5, brevia, deltoideo-ovata, æstivatione subvalvata, immutata. Petala 5, ovato-oblonga, æstivatione

imbricata, costa extus prominente carinata, evenia, scarioso-accrescentia, persistentia. Stamina sterilia 10, minuta, sed antherifera, sinubus disci pateræformis 10-crenulati inserta. Ovarium ovatum, subobliquum: styli 3, subulati: stigmata capitata. Ovulum a funiculo elongato supra-basilari adscendente pendulum. Fructus immaturus utriculatus (corollam marcescentem haud superans), compressus, apice hinc exciso obliquus, pericarpio prorsus membranaceo haud alato. — Frutex pinnatifolius; floribus parvis paniculatis rubellis vel (ut dicitur) læte rubris.

VEATCHIA CEDROSENSIS. — Foliis canescenti-puberulis; foliolis 3–5-jugis cum impari ovatis ovalibusque parvis (lin. 1–3 longis) integerrimis vel obsolete paucidentatis, terminali quandoque trilobo; pedicellis et ovario villosulis; petalis calyce plus duplo longioribus demum ¼-pollicaribus. — *Rhus Veatchiana*, Kellogg, in Proc. Cal. Acad. ii. 24. — Cedros Island, Lower California, *Dr. J. A. Veatch.*

In his recent monograph, Prof. Engler suggests that this plant, judging from the figure, may be a *Bursera.* But no figure is given or referred to in our copy of the Proceedings of the California Academy, in which Dr. Kellogg, although describing it as a *Rhus*, thought it was closely allied to *Sapindaceæ.** An original specimen, kindly communicated by the California Academy, enables me to bring to view its real characters, and to found on it a new genus; the fruit of which (though quite immature) cannot be either drupaceous or samaroid, but is obviously utricular.

We may dedicate this genus to the memory of its discoverer, the first and [except Lieut. L. Belding] perhaps still the only botanical explorer of Cedros Island. The genus *Veitchia* among the Palms need not stand in the way of this merited honor, for the Latinized names differ in pronunciation as well as in orthography.

LYONOTHAMNUS, Nov. Gen. *Rosacearum?*

Flores hermaphroditi. Calyx 1–3-bracteolatus: tubus hemisphæricus: lobi 5, æstivatione imbricati. Discus tubum calycis vestiens, lanatus,. margine vix incrassato 10-crenulato. Petala 5, orbiculata,

* Since this account was printed in the California Bulletin, I have received a copy of the plate referred to, a colored lithograph from Dr. Kellogg's drawings, representing a flowering branch of the natural size, and a probably in part ideal figure of what seems to be a low tree or tree-like shrub, with a thick and short trunk and widely spreading branches of extraordinary thickness, the branchlets covered with pale red or pink flowers.

prorsus sessilia, æstivatione imbricata. Stamina 15, margini disci cum petalis inserta (ante petala gemina, ante sepala solitaria): filamenta simplicia filiformia. Carpella 2, libera et discreta, in fundo calycis arcte sessilia: ovaria ovata, intus complanata, processibus setiformibus brevibus undique instructa, stylo crasso terminata: stigma subcapitatum. Ovula 4, pendula, oblonga. Folliculi ——— ? — Arbuscula insignis; foliis oppositis lanceolatis petiolatis neriiformibus subintegerrimis; stipulis nullis; gemmis annotinis perulatis; floribus in cyma terminali corymbiformi amplissima numerosissimis; petalis albis.

LYONOTHAMNUS FLORIBUNDUS. — Island of Santa Catalina, California, on a high and exposed rocky ridge of the northwest part of the island: a single group found, of arborescent shrubs, 12 to 14 feet in height, collected by *William S. Lyon*, July, 1884.

This striking shrub is one of the fruits of Mr. Lyon's exploration of Santa Catalina Island, the first thorough one which has yet been made. As a well-earned acknowledgment of the discoverer's enterprise in botanical exploration, I propose that the genus shall bear his name. Preoccupation stands in the way of the usual form; but the name chosen, which denotes that this is Mr. Lyon's shrub, will not be thought amiss. To the characters above given it may be well to add, that the young foliage, branches of the cyme, and the calyxes are covered with a fine and soft pubescence, which is deciduous from the leaves, at least from their upper face; that the latter are 4 or 5 inches long, mostly rounded at the base, which is occasionally sinuate-lobulate: they are coriaceous, transversely many-veined in the manner of *Nerium*, but the veins more prominent beneath. The flowers (with petals only a line or two long, little exceeding the calyx-lobes), though individually small, are so numerous and crowded in the very broad and ample compound cymes (of sometimes a foot in diameter) that they make a fine show.

Whether this genus is Rosaceous or Saxifragaceous cannot be fairly determined until the fruit is known. I am disposed to refer it to the former, and to the neighborhood of *Vauquelinia* and *Lindleya*, notwithstanding the opposite and exstipulate leaves. If Saxifragaceous, it may be associated with *Jamesia*.

PRINGLEOPHYTUM, Nov. Gen. *Acanthac.-Justiciearum.*

Calyx minute 2-bracteolatus, 5-partitus, segmentis æqualibus oblongo-linearibus rigidulis 3-nervatis. Corolla subdeclinata: tubus cum fauce brevi vix ampliori cylindraceus, limbo paullo longior: limbus

bipartitus; labiis patentibus, postico bipartito lobis oblongis, antico trifido majore, lobis obovatis, intermedio emarginato. Stamina 4, fauci inserta, subinclusa: filamenta brevia, antica villosissima: antheræ uniloculares, ovato-oblongæ, anticæ secus connectivum villosæ, posticæ cum filamento fere nudæ. Stylus filiformis: stigma emarginatum. Ovarii loculi biovulati. Capsula oblonga, subteres, nec stipitata nec basi attenuata, disperma. Semina ovalia, subturgida, furfuracea. — Suffrutex glaucescens; ramis gracilibus; foliis lanceolatis integerrimis, floralibus ad bracteas calycibus breviores reductis; floribus parvulis graciliter interrupte spicatis; corolla ut videtur purpurascente.

PRINGLEOPHYTUM LANCEOLATUM. — Northwestern borders of Mexico, in Sonora; on rocky hills fifty miles below Altar, and thirty miles from the Gulf of California, coll. *C. G. Pringle*, 1884. Genus allied to *Holographis* of Nees, which, although unknown to the authors of the new Genera Plantarum, has been identified by Hemsley with no. 1211 of Coulter's Mexican collection, from Zimapan. Nees does not describe the upper lip of the corolla: in Coulter's specimen this is erect and entire. In the present genus it is 2-parted, as much disposed to be patent as the lower lip; the throat is not ampliate, only two of the anthers are pubescent, and the filaments of these are woolly-bearded.

This genus is dedicated to the discoverer, Mr. C. G. Pringle of Vermont, one of the most zealous and enterprising of our botanists and the best of collectors, whose explorations in former years have brought many new and interesting plants to light. The present genus and the following new genera are among the fruits of very arduous and hazardous excursions made during this year from Arizona into the northwestern borders of Sonora, where no botanist had hitherto penetrated. The lengthened name here chosen is necessary on account of the *Pringlea* in *Cruciferæ*, which commemorates the celebrated Sir John Pringle of a century ago.

PHAULOTHAMNUS, Nov. Gen. *Phytolaccacearum.*

Flores dioici. Calyx 4-partitus, segmentis herbaceis rotundatis valde imbricatis. Discus nullus. *Masc.* Stamina 12, circa rudimentum (nunc evanidum) ovarii inserta: filamenta distincta, tenuia, antheris lineari-oblongis basifixis breviora. *Fœm.* Ovarium ovoideum, prorsus liberum, uniloculare, uniovulatum. Stigmata 2, filiformia. Ovulum in funiculo basilare erectum, amphitropum. Fructus tenui-coriaceus, indehiscens, calyce erecto semi-inclusus. Semen pericarpium

implens, reniforme; testa crustacea nitida. Arillus nullus. Embryo fere annularis, albumen parcum cingens: cotyledones angusto-lineares, planæ, vix inæquales, radicula gracili longiores. — Frutex boreali-Mexicanus, orgyalis, glaber; ramulis divaricatis spinescentibus; foliis alternis nunc fasciculatim confertis spathulatis parvis integerrimis; floribus parvis racemulosis brevipedicellatis parvi-bracteatis.

PHAULOTHAMNUS SPINESCENS. — N. W. Sonora, Mexico, about thirty miles south of the U. S. boundary, and on the Rio Altar, nearer the line, *C. G. Pringle*, August, 1884. The name (φαῦλος, θάμνος) indicates that this is an uncomely shrub, ill to handle. But it is an interesting addition to the order *Phytolaccaceæ*.

HIMANTOSTEMMA, Nov. Gen. *Asclepiadacearum*.

Calyx 5-partitus, sinubus squamella minima instructis. Corolla alte 5-partita, mox reflexa, intus saltem basi processibus plurimis corollinis spathulatis insigniter ornatis; lobis lato-lanceolatis æstivatione dextrorsum leviter obtegentibus. Corona staminea apici columnæ brevis filamentorum affixa, simplex margine membranacea, ligulas 10 prælongas angusto-lineares stipitatas per paria antheris alternantes, et 5 breves subulatas antheris oppositas eaque haud superantes uniseriatim gerens. Antheræ breves, sinubus stigmatis parum dilatati et angulati vertice depressi appositæ, inappendiculatæ, loculis apice hiantibus. Pollinia ovalia, apice pellucido caudicula brevissima appensa, introrsum subpendula. Folliculi fusiformes, echinati. — Herba boreali-Mexicana, vix volubilis, puberula; foliis oppositis sagittato-cordatis; pedunculis axillaribus umbellato-bifloris; corolla extus viridula intus brunneo-purpureis; ligulis coronæ viridulis.

HIMANTOSTEMMA PRINGLEI. — Along water-courses among the rocky hills of N. W. Sonora, Mexico, south of Altar, and about thirty miles from the Gulf, *C. G. Pringle*, August, 1884. — Stems diffuse from a perennial root, a foot or two long, probably feebly voluble, slender. Leaves less than an inch long, and the petiole of equal length. Peduncle short, 3–4-bracteate at the summit, bearing usually two flowers on elongated pedicels. Calyx-lobes linear-lanceolate. Corolla-lobes 4 lines long, thickish, veinless; the upper face sometimes nearly naked, usually beset with some sparse trichomes, like those of the throat, but smaller; the throat or base of the corolla conspicuously adorned with these singular corolline processes, which are sometimes very numerous, sometimes fewer, but in no obvious order, of purplish hue, fully a line in length, apparently flat, spatulate in form, and

stipitate. The long divisions of the corona are fully 2 lines in length, $\frac{1}{8}$ of a line wide, erect, in the just opening blossom nearly equalling the corolla; they are accordingly very conspicuous: the five subulate processes opposite the anthers are inconspicuous and are somewhat incurved. The stigmatic disk is smaller in proportion than in most *Gonolobeæ*, and does not at all cover the anthers: these are wholly destitute of scarious apical appendages, and the pollinia are obviously pendulous and disposed to be vertical. Still the affinity of this plant seems manifestly to be with *Gonolobus* and *Polystemma*. It cannot well be referred to the latter, although it may be near it. The generic name (ἱμάντος, στέμμα) refers to the strap-shaped lobes of the corona.

ROTHROCKIA, Nov. Gen. *Asclepiadacearum*.

Calyx 5-partitus, intus squamellis minimis 3–4 instructus. Corolla rotata, profunde 5-fida, lobis oblongis anguste dextrorsum convolutis. Corona simplex, imæ basi corollæ et tubo stamineo inserta, 5-partita, lobis antheris oppositis crassis subcuneatis vix cucullatis. Antheræ breves: pollinia ovalia, sub apice caudiculæ brevi adfixa, pendula. Stigma vertice in columnam apice tricristatam producto. Folliculi crassiusculi, acuminati, læves. Semina comosa. — Herba volubilis, pubescens, basi suffrutescens; foliis oppositis cordatis acuminatis longe petiolatis, petiolis ramisque patenti-hirsutis; cymis axillaribus laxis bracteolatis demum racemiformibus; corolla albida.

ROTHROCKIA CORDIFOLIA. — Southern Arizona (Catalina Mountains, &c.), where it seems to have been first collected by *Lemmon*, in April, 1881, in fruit only, and the specimens taken for *Roullinia unifaria*, perhaps distributed under that name: in 1884 collected by *Pringle*, both in flower and in fruit, in Northwestern Sonora (along with *Himantostemma* and *Pringleophytum*) in a range of rocky hills southwest of Altar.

The genus is dedicated to my friend and former pupil, Dr. J. Trimble Rothrock, Professor of Botany in the University of Pennsylvania, at Philadelphia, a keen botanist and zealous teacher, an explorer both in Alaska and in Arizona, author of a Sketch of the Flora of Alaska, and of the Botany of Wheeler's Report upon the U. S. Surveys of Arizona and Southern California, and whose name it is well to commemorate in an Arizono-Mexican genus. The plant seems most like *Enslenia*, *Roullinia*, or the *Endotropis* section of *Cynanchum*. Its main peculiarity is in the apical process of the stigma, a short and thick body with dilated base, somewhat longer than the whole column, its apex

dilated into two divaricate lobes or crests, which are muriculate-papillose, and between these a smaller and emarginate central crest is interposed.

LACHNOSTOMA ARIZONICUM. Pilis brevibus pubescens; caulibus gracilibus libenter volubilibus; foliis membranaceis cordato-sagittatis; pedunculis gracilibus 2–7-floris; corollæ albæ extus glabræ tubo sepala subæquante lobis ovato-oblongis parce viridi-reticulatis vix breviore, fauce retrorsum villosa; corona simplici nuda crateriformi præter marginem liberum crassiusculum 10-crenatum tubo corollæ adnata (eo vestiente); columna filamentorum longiuscula; folliculis ovoideo-lanceolatis lævibus glabris. — Southern Arizona; in the Santa Catalina Mountains, *Lemmon* (no. 3036, coll. 1883), distributed as *Gonolobus reticulatus;* and in the same district, coll. *Pringle*, 1884. — The main distinctions between *Lachnostoma* and *Gonolobus*, namely, the short-salverform or at least tubular-based corolla of the former, with corona adnate to the tube, were indicated in Proc. Am. Acad. xii. 74, when the only true species then known was the original *L. tigrinum*, HBK. Since then, in Bot. Biol. Centr.-Amer. ii. 335, Hemsley has added a second species, from Guatemala; and I consider that we have a third in the present plant. The principal structural difference is that the corona is not produced beyond the adnate portion into five two-lobed squamæ; but these are represented by the ten crenulations or short lobes of its free border. These are glabrous: the villosity belongs wholly to the throat of the corolla. The filaments are somewhat longer than in *L. tigrinum*, and, though monadelphous, are disposed to separate in withering flowers.

ACERATES BIFIDA, Rusby in litt. *A. viridiflorœ* sat similis; foliis omnibus oppositis puberulo-tomentosis lato-lanceolatis basi attenuatis; floribus paullo minoribus longius pedicellatis; cucullis pallidioribus antheris parum brevioribus *bipartitis*, segmentis lanceolatis. — Arizona, coll. *Dr. H. H. Rusby*, 1883, probably in Yavapai Co., in a single specimen. — Botanists collecting in Arizona should find again this remarkable species, so peculiar for its divided hoods. It has probably escaped attention on account of its near general resemblance to the polymorphous and widely diffused *A. viridiflora.* It might be referred to the section of the genus which contains that species, or a new section may be made for it, indicating the peculiarity of the two-parted hoods, of which there is no trace in any other species of *Acerates.* The discoverer had not unnaturally taken the plant for a *Gomphocarpus*, but it clearly belongs to the present genus.

4. *Gamopetalæ Miscellaneæ.*

Compositæ.

BRICKELLIA NEVINII. E basi fruticosa multicaulis, tomento mollissimo subfloccoso incana; ramis gracilibus usque ad capitulas corymboso-thyrsoideas foliatis; foliis alternis parvulis, caulinis semipollicaribus ovatis repando-subdentatis brevipetiolatis, superioribus ramealibusque bracteiformibus arcte sessilibus; capitulis 30–40-floris semipollicaribus; involucro oblongo pluriseriali, bracteis obtusiusculis paucistriatis, exterioribus lanceolatis subfoliaceis parum squarrosis, intimis angusto-linearibus; pappo minute scabro. — Los Angeles Co., California, near Newhall, Oct. 1884, *J. C. Nevin.* A remarkable species, white-woolly in the manner of *B. incana* and *B. Hartwegi*, in other respects allied to *B. microphylla*

APLOPAPPUS ORCUTTII. *A. squarroso* affinis, pariter fruticosus, fere glaber; ramis virgatis; foliis resinoso-punctatis mox glutinosis spathulato-lanceolatis acutatis integerrimis crasso-coriaceis; capitulis plurimis in thyrsum strictum digestis iis *A. squarrosi* minoribus et angustioribus 15–18-floris; involucri bracteis apice viridulo squarroso-patente viscoso-puberulis; floribus radii 2–4 fertilibus ligula parva discum paullo superante; fl. disci appendicibus styli lato-lanceolatis parte stigmatica plus dimidio brevioribus; acheniis (junioribus) pubescentibus. — All Saints' Bay, in the northern part of Lower California, C. R. Orcutt, Sept. 1884. An interesting species, connecting the rayless *A. squarrosus* with the radiate Pyrrhocomoid species.

ERIGERON NUDATUS. *E. Bloomeri* proximus, glaberrimus, lævis; caulibus cæspitosis brevissimis folia conferta spathulato-linearia obtusa crassiuscula fere evenia gerentibus; pedunculis scapiformibus simplicibus monocephalis ultraspithamæis; involucri biserialis bracteis æqualibus crassiusculis lanceolatis acutis prorsus viridibus aut glaberrimis aut pilosiusculis glabratisque; ligulis nullis; acheniis obovato-oblongis parce pubescentibus; pappo simplici albido. — Dry hillsides, Waldo, S. W. Oregon, *Howell*, June, 1884.

SILPHIUM BRACHIATUM, Gattinger.* Caule quadrangulo (3–5-pedali) foliato cum ramis floriferis brachiatis gracillimis subnudis teretibus glabro lævique; foliis oppositis supra hispidulo-scabridis, caulinis longiuscule petiolatis deltoideo- vel hastato-lanceolatis subdentatis, petiolo parum marginato hispido-ciliato, ramealibus dissitis

* Now described by the discoverer in Coulter's Botanical Gazette, ix. 192.

parvulis sessilibus integerrimis; capitulis longe pedunculatis parvulis; involucri bracteis ovatis; acheniis obovato-orbiculatis angusto-alatis apice parum emarginatis. — Mountains of Eastern Tennessee, near the Tunnel at Cowan, Franklin Co., on limestone, *Dr. A. Gattinger*, coll. July 14, 1867. By a singular mischance this very distinct *Silphium* was not made known to me until after the publication of the Compositæ in my Synoptical Flora. A subdivision should be provided for it, to follow that which contains *S. perfoliatum*. The cauline leaves are 6 to 10 inches long, on petioles of $1\frac{1}{2}$ to 2 inches; the small and remote leaves of the slender flowering branches are only an inch or two in length, the 1–3-flowered peduncles 3 or 4 inches long and almost filiform. Involucre little over half an inch high. Rays rather few, half an inch long. Akenes 4 lines long.

Franseria flexuosa. *Acantholæna, F. deltoideæ* affinior, frutescens, canescens, mox glabrescens; ramis gracilibus flexuosis; foliis deltoideo-lanceolatis vel basi breviter cuneatis brevipetiolatis attenuato-acuminatis parce spinuloso-dentatis laciniatisque rigidis transverse penniveniis e costa valida subtus reticulatis; panicula aphylla; involucris fructiferis brevi-ovoideis 2–3-floris (lin. 2–3 longis) pubescentibus aculeis paucis (7–8) validis subulatis e basi lata mox recurvis (apice recto) armatis. — Cañon Cantillas, within the borders of Lower California, *Orcutt*, 1884. The foliage is somewhat like that of *F. ambrosioides*, but with the rigidity of *F. ilicifolia*, yet the teeth or lobes of the leaves are hardly spinescent. The fruit is that of the *Acantholæna* section of the genus, its spines thicker than those of *F. deltoidea*, and beset with short pubescence.

Helianthus tephrodes, Gray. Annuus; caule ramoso pl. m. hispidulo; foliis ovato-lanceolatis seu ovato-oblongis subintegerrimis (circ. pollicaribus) longius petiolatis utrinque ramisque pube sericeo-strigosa incanis; involucri (lin. 4–5 alti) bracteis lanceolatis subacuminatis fere æquilongis; receptaculi paleis subintegerrimis acutis plerumque glabris; acheniis lineari-oblongis vel subclavatis turgidis (parum compressis sericeo-pilosis vel inferne glabratis); pappo caduco e squamellis 2 oblongis vel linearibus pilis apicalibus achenii aut brevioribus aut longioribus. — Bot. Mex. Bound. 90. *Viguiera nivea*, Gray, Bot. Calif. i. 354, excl. syn. *V. tephrodes*, Gray, Syn. Fl. ii. 271. *Gymnolomia encelioides*, Gray, Proc. Am. Acad. xix. 4, & Syn. Fl. ii. 269. — Complete specimens, with some mature fruit, from "sand-hills in N. W. Sonora, near the Gulf," coll. Pringle, 1884, now at length fix this species under the name which I first applied to very scanty and imperfect materials, and show that what were taken for fine

setiform or dissected squamellæ between the small or minute paleæ are only hairs of the akene. And my *Gymnolomia encelioides* proves to be a more robust and less hoary form of the same species, with ampler rays, the pappus in some flowers very manifest.

HELIANTHUS OLIVERI. E grege *H. Parishii* et *Californici*, indumento molli insignis, elatus, sat ramosus, foliosus, floribundus; ramis superne villoso-hirsutis vix scabris; foliis utrinque pube mollissima canescenti-tomentosis (subtus præsertim) alternis lanceolatis acuminatis fere integerrimis juxta basim acutiusculam triplinerviis brevipetiolatis; involucri bracteis lineari-subulatis laxis albo-villosis; pappi paleis e basi lata subulatis. — Coast of California, Cienega, between Los Angeles and Santa Monica, *J. C. Oliver;* received from *J. C. Nevin*, 1884. It is said to attain a height of ten or twelve feet, and its soft and rather villous than tomentose pubescence is remarkable.

VERBESINA DISSITA. Herbacea, fere glabra et lævis; caule elato tereti prorsus aptero; foliis oppositis, caulinis (imis ignotis) internodiis valde brevioribus ovatis serratis basi angusta sessilibus tenui-membranaceis subtriplinervibus venosis; capitulis in pedunculo subpaniculatis (semipollicaribus); involucro multifloro cinereo-puberulo, bracteis pauciusculis lineari-lanceolatis acutis disco brevioribus; ligulis paucis neutris; acheniis cum alis latis obovatis fere glabris, aristis basi alæ coalitis. — Near All Saints' Bay, Lower California, Sept. 1884, *C. R. Orcutt.* — This is the only known species of the *Pterophyton* section in any part of California, except the allied *V. venosa*, Greene (in Proc. Am. Acad. xix. 13). It is of the naked-stemmed group, apparently a full yard high, and with the pairs of leaves remote.

Chænactis suffrutescens, which was founded on Lemmon's plant from the northern part of California, was in the Synoptical Flora, i.[2] 341, confounded with a related species from the southern borders of the State, and the proper habitat was unreasonably discredited. Both are suffrutescent-perennial: they may be distinguished as follows.

CHÆNACTIS SUFFRUTESCENS, Gray. Tomentoso-incana; ramis e caule decumbente lignoso erectis simplicissimis apice nudo monocephalis; foliis pinnatipartitis, lobis angusto-linearibus integerrimis; capitulo fere pollicem alto; pappi paleis 10 semper oblongo-lingulatis. — Proc. Am. Acad. xvi. 100, & Syn. Fl. l. c. pro parte. — Sandwashes of the Upper Sacramento, California, near Mount Shasta, *Lemmon* 1879.

CHÆNACTIS PARISHII. Canescens; caulibus basi suffrutescentibus parce ramosis oligocephalis; foliis pinnatipartitis, lobis linearibus

brevibus integriusculis; capitulo vix ultra semipollicem alto; pappi paleis linearibus 13–15. — *C. suffrutescens*, Gray, Syn. Fl. l. c., quoad pl. coll. Parish. — On the southern border of California, 1882, *Parish Brothers*, and near Hanson's Ranch, within Lower California, *C. R. Orcutt*, 1884.

MICROSERIS HOWELLII. *Scorzonella*, post *M. sylvaticam;* caule gracili e radice fusiformi 1–3-cephalo sæpe ramoso; foliis elongatis (majoribus pedalibus) angusto-linearibus sursum attenuatis aut integerrimis aut lobulis paucis refractis; capitulis parvulis 15–20-floris; involucri bracteis acuminatis, interioribus (semipollicaribus) oblongo-lanceolatis exteriores paucas basi subovatas 2–3-plo superantibus; pappi setis 8–10 nudis (sub lente tantum denticulatis) basi in paleam lanceolatam 4–5-plo breviorem sensim dilatatis. — Waldo, S. W. Oregon, June 3, 1884, *Howell.*

Ericaceæ.

CASSIOPE OXYCOCCOIDES. Habitus *Loiseleuriæ* vel *Vaccinii Vitis-Idææ* depauperatæ; foliis plerisque oppositis ellipticis crasso-coriaceis (lin. 2–3 longis) aperte petiolatis, marginibus pl. m. revolutis, costa subtus prominente; pedunculo terminali brevi apice involucratim 4-bracteato trifloro; pedicellis brevissimis; floribus 5-meris; corolla sepalis oblongis subduplo longiore sub-urceolato-campanulata, ore breviter 5-lobo. — A peculiar little plant, growing among Mosses and Lichenes, along with *Diapensia*, on Behring or Bering Island, off the coast of Kamtschatka, coll. 1883 by *Dr. L. Steineger*, a single specimen only in the collection, where *Bryanthus Gmelini* was also gathered. It appears to be a congener of *Cassiope Stelleriana*, but with a narrower mouth and much shorter lobes to the corolla, and a different habit and foliage, as the comparisons in the specific character indicate. Dr. Steineger made interesting collections on these islands, so long ago explored by Steller and little visited since. A list of the plants gathered by him, with interesting notes, is published in the Bulletin of the National Museum, Washington.

SCHWEINITZIA, *a Genus of two Species.*

The discovery of a second species of a genus supposed to be monotypical is always interesting, the more so when the genus itself is peculiar. The genus *Schweinitzia* of Elliot, a member of the *Monotropeæ*, is of this kind. Some time ago I received from Miss Mary C. Reynolds, at first indirectly and then directly, specimens which differ from the original *S. odorata*, and now (December 9) I am

favored by the discoverer with a full series of freshly gathered specimens. I am convinced that two species are to be distinguished, and that they may be characterized as follows.

S. ODORATA, Ell. in Nutt. Gen. Addend., & Sk. i. 478; Gray, Chloris Bor.-Am. 15, t. 2, & Syn. Fl. ii. 49, ubi syn. Squamis caulem pl. m. imbricantibus lato-ovatis; floribus breviter spicatis parum cernuis; sepalis oblongis corollam "carneam" subæquantibus. — Maryland, near Baltimore, to North Carolina, from the middle country to the Blue Ridge.

S. REYNOLDSIÆ. Gracilior; squamis parvulis (lin. 1–3 longis) haud imbricatis; spica angusta secundiflora nuda e floribus sat numerosis mox nutantibus; sepalis ovatis seu ovato-lanceolatis corolla alba (vix lin. 3 longa) dimidio brevioribus. — E. Florida, near St. Augustine and on Indian River, flowering in November and December, under scrub oaks, in dry sandy soil: collected only by *Miss Reynolds*, whose name the species is to commemorate. The plant is said at times to exhale a slight spicy fragrance.

Polemoniaceæ.

GILIA BELLA. *Dactylophyllum*, post *G. auream*, e basi ramosa; caulibus filiformibus spithamæis lævibus; foliis parcis brevissimis tripartitis cum nodo villosulis, segmentis lato-linearibus carinatis; pedunculis seu potius ramis floridis sæpe proliferis flores 2–3 inter bracteas subsessiles gerentibus; calycis lobis folia referentibus crasso-carinatis fere ad apicem hyalino-marginatis; corolla infundibulari-campanulata (lin. 5 longa), tubo calycem æquante flavo, fauce atro-purpureo maculata, lobis violaceis flabelliformibus integerrimis tubo æquilongis; filamentis basi pilosulis; ovarii loculis multiovulatis; seminibus madidis haud mucilaginosis. — At Hanson's Ranch, Lower California, near the boundary, *Orcutt*, 1884. A pretty species, abundantly floriferous.

GILIA (PHLOGANTHEA) MACOMBII, Torr. in herb. A basi vel caudice suffrutescente multicaulis, puberula; caulibus 1–2-pedalibus glomerato-thyrsifloris; foliis rigidulis in segmenta 3–6 rhachi haud latiore pinnatipartitis vel superioribus integerrimis filiformi-linearibus; corolla violacea hypocraterimorpha, tubo sursum leviter ampliato semipollicari calyce hirsutulo vel glabello 3–4-plo longiore, lobis æqualibus obovatis mucronulatis; staminibus inæqualiter insertis 2–4 (sæpius 3) e fauce breviter exsertis, filamentis rectis; ovarii loculis 3–6-ovulatis. — This is *Gilia multiflora*, Torr. Bot. Mex. Bound. 146, in part, and part of *Collomia Cavanillesiana*, Gray, Syn. Fl. ii. 136, being Wright's no. 1647, and an imperfect specimen of it, collected by *Newberry*

in Macomb's expedition, and named by Torrey *G. Macombii*, is the same. This name should therefore come into use, now that the three species which I had confounded may be made out, thanks to good specimens collected by *Lemmon* in 1880 and 1882, and by *Pringle* in 1884, these all in the southern part of Arizona, while Newberry's specimen is probably from farther north. In Proc. Am. Acad. xvii. 223, I have assigned the reasons for referring all of *Collomia* group back to *Gilia*. This species is more showy than the two following, but less so than *G. Thurberi*, Gray, l. c., with its corollas an inch and a half long, which has been collected by *Greene* in 1881, *Lemmon* in 1882, and *Pringle* in 1884.

Gilia glomeriflora, Benth. in DC. Prodr., so far as we know wholly Mexican, has more filiform foliage, smaller and whitish corollas with pointless lobes, and the stamens wholly included and almost or quite equally inserted; but the last character cannot be absolutely trusted.

Gilia multiflora, Nutt. Pl. Gamb., or the plant which from the station and the description I take to be this species (being New Mexican as well as Arizonian, and occurring in most collections, and probably not perennial), has the foliage and habit of *G. Macombii*, or perhaps is more branching, is more pubescent, and the calyx hirsute; the purplish limb of the corolla somewhat unequally divided (i. e. one sinus deeper); its lobes narrower; the stamens of equal or unequal insertion, conspicuously exserted, and the upper part of the filaments more or less declined and curved, often conspicuously so. I find the ovules to vary from one pair to two pairs in each cell.

Lœselia (Giliopsis) guttata. *L. tenuifoliæ* peraffinis, pariter suffrutescens, glabra; corolla lilacina vel pallida lobis purpureo-guttatis angusto-cuneatis apice tridentatis stamina æquantibus tubo (semipollicari) paullo brevioribus. — Near Hanson's Ranch, northern part of Lower California, *C. R. Orcutt*, Sept. 1884.

Ellisia (Eucrypta) Torreyi. Diffusa, debilis; foliis pinnatipartitis segmentis oblongis sinuato-pinnatifidis vel crenatis, inferioribus sæpe bipinnatifidis; racemis paucifloris; calyce corollam parvam æquante, fructifero capsulam superante. — Yampai Valley, on the Lower Colorado (*Phacelia micrantha?* var. *bipinnatifida*, Torr. in Ives Colorado Rep. Bot. 21); and along the borders of Sonora and Arizona, *Pringle*, 1884. Imperfect specimens of this had been passed as a form of *Phacelia micrantha*.

Phacelia Rattani. *Euphacelia, P. malvæfoliæ* peraffinis, minor, gracilis, setis tenuioribus sed urentibus hispida; foliis ovatis ovalibusque

basi nunc subcordatis; spicis laxiusculis; sepalis 4 spathulatis, uno sæpius obovato multo majore; corolla parva (vix ultra lin. 2 longa alba vel purpurascente); staminibus styloque inclusis. — Moist and shady grounds, Lake Co. and northward in California, *V. Rattan*, June, 1884, *Mrs. Layne-Curran*, July, 1884. Grant's Pass, S. Oregon, *Howell*. Seeds barely half the size of those of *P. malvæfolia*, with inner angle acute but less carinate, and the converging sides plane. This was separately discovered by three collectors nearly at the same time; but it first came to hand from Mr. Rattan.

PHACELIA INVENUSTA. *Euphacelia*, *P. crenulatæ* quoad folia subsimilis, haud graveolens, semi- vel sub-pedalis; foliis omnibus petiolatis oblongis obtusissimis crenato- vel sinuato-paucilobatis nunc lyrato-pinnatifidis adpresso-puberulis; cymis viscidulo-glandulosis absque pilis setiformibus; floribus parvulis; sepalis sursum parum dilatatis; corollis lin. 2 longis; staminibus styloque inclusis; capsula globosa; seminibus ovalibus marginibus incurvis carinaque demum tuberculato-rugosis. — Arizona, on Patagonia Mountains, 1880, *Lemmon* (84, 161), and near Flagstaff, *Lemmon*, 1884; also near Tucson, *Pringle*, 1884, along with *P. crenulata*. The latter is unpleasantly scented (which this is not) and has much larger flowers, with well-exserted stamens and style and usually hirsute pubescence. *P. cærulea*, Greene, also of Arizona, is the nearest to *P. invenusta*.

PHACELIA POPEI, Torr. & Gray, is a good species, as distinct from *P. glandulosa*, under which name it has recently been distributed by A. H. Curtiss (no. 2128). It has short-oval and more pitted seeds, the edges of the pits muriculate-toothed, therefore rougher.

PHACELIA ARIZONICA, Gray. To this no. 1580 of C. Wright's Arizona and New Mexican collection appears to belong.

PHACELIA (EUTOCA) LYONI. Viscido-pubescens; caule pedali sat robusto; foliis et inflorescentia fere *P. glandulosæ;* corolla lato-campanulata, appendicibus semi-ovalibus ima basi filamentis suis accretis; genitalibus haud exsertis; capsula angusto-oblonga polysperma sepalis lineari-spathulatis hispidis et viscosis paullo breviore; seminibus ovalibus (paullo ultra semilineam longis) scrobiculatis. — Island of Santa Catalina off Los Angeles, California, *W. S. Lyon*, 1884. — This is most nearly related to the following, of which a long description has been published, but which still needs a diagnostic character.

PHACELIA IXODES, Kellogg in Bull. Calif. Acad. i. 6. Undique viscido-villosa, graveolens, procera; foliis amplis pinnatipartitis nunc pinnatifidis, segmentis lobisve oblongis inciso-dentatis vel sinuato-pinnatifidis; corolla (cærulescente) lato campanulata, lobis latissimis

rotundatis, appendicibus semi-orbiculatis prorsus adnatis obliquis ima basi staminis accretis; genitalibus parum exsertis; capsula oblonga polysperma sepalis spathulatis parum breviore; seminibus (fere lineam longis) oblongis angulatis asperulo-scrobiculatis. — Cedros Island off Lower California, collected by the late *Dr. Veatch*. All Saints' Bay, Lower California, *H. C. Orcutt*. A coarse species, very clammy and heavy-scented, rather large-flowered. The stamens and style are exserted in the specimens described by Dr. Kellogg, but included or nearly so in those from All Saints' Bay: otherwise no difference is perceived. The root of both these nearly related species is unknown to us. But the latter is said by Dr. Kellogg to be perennial.

PHACELIA (EUTOCA) SAXICOLA. Consors *P. pusillæ*, Torr., e radice annua ramosissima, spithamæa, hirsutula, subviscosa; foliis spathulatis integerrimis in petiolum gracilem angustatis; floribus brevipedicellatis sparsis; sepalis spathulato-lanceolatis corolla oblongo-campanulata cærulea (lin. 2 longa) aut duplo aut paullo longioribus; plicis corollæ angustissimis; capsula ovali-oblonga polysperma; seminibus subglobosis læviusculis. — In crevices of granite rocks, at Kingman's Station, N. W. Arizona, April–May, 1884, *Mr.* and *Mrs. Lemmon*. "The roots, insinuating themselves into crevices, cleave off scales of the rock."

NAMA HAVARDI. (Inter *N. stenophyllum* et *N. Palmeri*.) Pube prorsus molli brevi subcinereum; caule herbaceo robusto ramoso ultrapedali (radice ignota); foliis oblongis acutiusculis basi attenuatis parum venosis; cymulis plurifloris brevi-pedunculatis; corolla (lin. 4–5 longa) hypocraterimorpha sepala linearia sursum vix latiora obtusa paullo superante; filamentis ad medium usque adnatis et subalato-marginatis edentatis; seminibus 16 vel pluribus ovoideo-globosis pauci-scrobiculatis. — Western borders of Texas, on alkaline banks of Tornillo Creek, August, 1883, *Dr. V. Havard*. The inflorescence is nearly that of *N. stenophyllum;* the leaves are broader (the largest 2 inches long, including the petiole-like base, and half an inch wide); there are no bristly hairs, but only soft pubescence; the sepals are more decidedly obtuse; and there are no vestiges of teeth to the filaments. — The two following depressed and small-flowered species were discovered and indicated as new species by Mr. and Mrs. Lemmon.

NAMA DEPRESSUM, Lemmon in herb. Annuum, a basi divaricato-ramosum, fere prostratum, pube minuta adpressa molli subcinereum; foliis spathulato-lanceolatis inferne sensim longius attenuatis quasi petiolatis; floribus in dichotomiis brevipedicellatis; corolla angusta purpurascente (lin. 2 longa) sepalis angustis sursum vix latioribus

paullo longiori, limbo parvo; capsula demum deflexa ovali-oblonga torosa; seminibus (lin. ¼ longis) ovalibus, testa tenui lævi parum undulata. — Southeastern borders of California, in the Mohave desert, near Fort Mohave, *Mr.* and *Mrs. Lemmon*, May, 1884. Leaves half-inch to an inch long, 2 lines wide. The place of this and the following species in the Synoptical Flora is between *N. Coulteri* and *N. dichotomum*.

NAMA PUSILLUM, Lemmon in herb. Annuum, exiguum, a basi ramosum, depressum, molliter pubescens; foliis obovato-spathulatis seu ovatis in petiolum marginatum subito angustatis; floribus in dichotomiis subsessilibus; corolla angusta (sesquilineam longa) roseo tincta extus hirsutula sepalis demum spathulatis paullo longiore, limbo parvo; capsula erecta ovali; seminibus subglobosis, obsolete rugulosis, testa diaphana lævissima. — Same locality and collectors as the preceding. Plants only an inch or so in height; the leaves half-inch or less in length, including the petiole.

Convolvulaceæ.

CONVOLVULUS PENTAPETALOIDES, L. A synonym of this South European species, which has found its way to California, probably with grain, is *Breweria minima*, Gray, Proc. Am. Acad. xvii. 228, which came from Lower California, where the advent of this plant was unsuspected.

Solanaceæ.

LYCIUM EXSERTUM. *L. gracilipedi* inter *Longiflora* proximum, puberulum, subspinosum; foliis spathulatis (majoribus semipollicaribus); pedicellibus gracilibus (lin. 4 longis); calyce angusto-campanulato (lin. 2–3 longo) lobis acutis tubo paullo brevioribus; corolla infundibuliformi semipollicari, tubo proprio calyci æquilongo, fauce elongato, lobis 5 ovato-triangularibus per anthesin reflexis; filamentis insigniter exsertis inferne villoso-tomentosis. — N. W. Sonora, near Altar, March, 1884, *Pringle*.

LYCIUM PARISHII. Inter *L. puberulum* et *L. Cooperi* collocandum, pube foliisque fere prioris; pedicellis gracilibus flore paullo brevioribus (lin. 3 longis); calycis lobis tubo fere æquilongis; staminibus e fauce corollæ exsertis lobis obtusissimis adæquantibus; antheris ovalibus. — Mesas in San Bernardino Valley, S. California, *Parish Brothers*.

LYCIUM PRINGLEI. Præcedenti affine, magis glanduloso-pubens; ramis gracilioribus; pedicellis (lin. 2 longis) calyce subæquilongis; calycis lobis oblongis foliaceis tubo suo longioribus corolla violacea

(lin. 4–5 longa) subdimidio brevioribus; filamentis basi crebre barbatis corollæ lobis rotundatis paullo brevioribus.

LYCIUM MACRODON, Gray, the remaining species of the calycose and pentamerous group, has been rediscovered by Mr. Pringle, at a more southern station, namely, within the borders of Sonora. It has remarkably long calyx-lobes, the white corolla tinged with green, and under the ovary an extremely large and deep orange-colored disk.

LYCIUM PALMERI, Gray, would seem to be the *L. quadrifidum* of Dunal.

Scrophulariaceæ.

ANTIRRHINUM SUBCORDATUM. Inter *Prehensilia*, *A. vaganti* proximium; pube tenuiori; caule robusto (basi ignoto) superne crebre folioso et florifero; ramis prehensilibus copiosis nunc sterilibus nunc parce floriferis; foliis crassiusculis (superioribus) ovatis basi plerumque subcorda arcte sessilibus; floribus fere sessilibus; sepalo postico maximo ovali stylo æquilongo cæteris lineari-lanceolatis longiore; corolla (semipollicari) ochroleuca, fauce ampla; filamentis longioribus apice dilatatis; seminibus favosis alveolis muriculatis. — Stony Creek, Colusa Co., California, *V. Rattan*, June, 1884.

PENTSTEMON HAVARDI. *Eupentstemon*, *Genuini*, glaber, glaucescens; foliis ovalibus oblongisque coriaceis fere *P. Wrightii;* thyrso nudo elongato virgato racemiformi, verticillastris sæpius 6-floris; sepalis brevibus ovalibus obtusis; corolla aut cærulea aut violacea tubulosa pollicari, labiis lin. 2 longis, postico erecto breviter bifido, antico trilobo patente, lobis rotundatis; filamento sterili filiformi nudo. — Guadalupe Mountains, Western Texas, not far from the Rio Grande, 1882, *Dr. V. Havard.* Apparently the same species (noted as having purple flowers) is no 245 of coll. *Wislizenus*, which is said to have been collected in Mr. Pott's garden at Chihuahua; but the specimen is too incomplete for certain determination. The ticket states that the species is spontaneous near Chihuahua.

PENTSTEMON NUDIFLORUS. *Eupentstemon*, glaberrimus, glaucescens, bipedalis; caule paucifoliato in thyrsum longum virgatum laxiflorum exeunte; foliis ovato-lanceolatis coriaceis integerrimis basi subamplexicauli sessilibus (majoribus tripollicaribus), superioribus dissitis mox in bracteas subulatas parvas pedunculis 3–1-floris gracilibus multo breviores diminutis; corolla (pollicari rubescenti?) e tubo sepalis lato-ovatis (lin. 2 longis) 2–3-plo longiore campanulato-ampliata, labiis lobisque brevibus patentibus; antheris subexsertis, loculis divaricatis oblongis prorsus bilocellatis; filamento sterili tota fere longitudine

piloso-barbato. — La Vergne Park, near Flagstaff, N. Arizona, 1884, *Mr.* and *Mrs. Lemmon.* In the inflorescence and flowers this neat species resembles *P. stenophyllus*, but the inflorescence (fully a foot long) is narrower and more virgate, the corolla smaller, the whole completely glabrous: the leaves are very different; and the pubescence along the whole length of the sterile filament is peculiar.

MIMULUS RATTANI. *Eunanus*, juxta *M. leptaleum* collocandus, viscido-pubescens, a basi ramosus, ultra-spithamæus; foliis oblongis sessilibus, imis basi angustatis superioribus flores subsessiles haud superantibus; corolla roseo-purpurea in calyce ventricoso subæqualiter 5-dentato fere inclusa, limbo parvulo tubo cum fauce infundibulari 3–4-plo breviore, lobis subæqualibus, posticis ad medium fere connatis; capsula lanceolata acutata coriacea e calyce amplo subdimidio exserta. — Mountains of Colusa Co., N. W. California; under *Adenostoma* bushes, *Volney Rattan*, June, 1884.

MIMULUS EXIGUUS. *Mimuloides* quoad calycem, facie *M. rubelli*, annuus, tenellus, fere glaber, diffuse ramosus; foliis (lin. 2–3 longis) subspathulatis sæpius parce denticulatis sessilibus; pedunculis capillaribus elongatis; calyce brevi-campanulato subturbinato æqualiter 5-dentato haud angulato vix nervato sesquilineam longo corolla rubella minima vix dimidio breviore; capsula ovali submembranacea calycem æquante, valvis axi placentæ indivisæ adhærentibus. — Mountains of Lower California, in the northern part, near Hanson's Ranch, *H. C.* and *C. R. Orcutt.* A peculiar and aberrant little species.

PEDICULARIS HOWELLII. *Rhyncholophæ, Proboscideæ*, glabra (spica excepta); caule pedali simplici infra medium aphyllo superne usque ad spicam compactam cylindraceam folioso; foliis oblongis, inferioribus brevi-petiolatis sublyrato-pinnatifidis partitisve (lobis 3–9 oblongis subserratis), summis sæpe integris; bracteis foliaceis ovatis acuminatis margine inferne villosis flore parum brevioribus; calyce campanulato longe parceque villoso 5-dentato, dentibus ovatis subintegerrimis, posticis altius connatis; corolla pallida tubo calycem superante, rostro roseo tincto longiusculo incurvo (eo *P. compactæ* simili sed apice truncato parum latiori), labio parvo. — Siskiyou Mountains, N. California, *Howell*, 1884. Belongs to the group of *P. compacta* and *P. uncinata*, but with quite different foliage and bracts, and with a very small under lip.

APHYLLON COOPERI. *A. Ludoviciani* et *A. multiflori* consors; caule spithamæo ad pedalem e basi tuberosa spicato-multifloro; floribus inferioribus pedicellatis, superioribus sessilibus; calycis lobis lanceolatis capsulam æquantibus; corolla violacea ($\frac{2}{3}$-pollicari) pro-

fundius bilabiata, labio postico semibifido, antico tripartito, lobis lanceolatis acutis; antheris ante dehiscentiam glabris; stigmate infundibuliformi-dilatato fere orbiculato. — In the Mohave district, S. E. California and adjacent Arizona; first collected at Fort Mohave by *Dr. J. G. Cooper*, in 1860, who states that the tuber-like base is bitter, but is eaten by the Indians; collected at Camp Lowell, Arizona, by *Parish* and by *Lemmon*, 1881, also, in the same year, in the Santa Catalina Mountains, by *Pringle*, and distributed as *A. Ludovicianum*, var. *Cooperi*. But it is evidently a distinct species.

Acanthaceæ.

DICLIPTERA PSEUDOVERTICILLARIS. Inter *Platystegias et Sphenostegias* media, annua, a basi ipsa ramosa et florens, fere glabra, vix pedalis; caulibus ramisve diffusis; foliis caulinis inferioribus ovatis acuminatis (ultra-pollicaribus) longe petiolatis, superioribus multo minoribus ovato-ellipticis brevipetiolatis involucris axillaribus subsessilibus foliiformibus plerumque æquilongis; bracteis involucri primum patentibus deltoideo-rotundatis obtusissimis retusisve (raro mucronulatis), basibus subito contractis in cyathum angustum sæpius coalitis; corolla brevi involucrum haud superante; seminibus processibus subulatis sub lente setuliferis muricatis. — N. W. Sonora, Mexico, in the valley of the Altar, April, 1884, *Pringle*. And imperfect specimens of seemingly the same species, with the narrowed bases of the involucral bracts mostly distinct, were collected by *Thurber*, in 1851, at Bacuachi, in the same district. In Mr. Pringle's specimens through all the upper part of the stem the involucres (which are shorter than the internodes), one in each axil, are about the length of the subtending leaves, their two leaves quite as broad as they, and at first open so as to give a verticillate appearance to most of the foliage. I take this opportunity to distinguish two species of *Dicliptera* of the Arizono-Mexican region which have been confounded.

DICLIPTERA RESUPINATA, Juss. Caule laxe ramoso e radice annua; foliis ovatis vel ovato- seu oblongo-lanceolatis longiuscule petiolatis; involucri bracteis cordato-rotundis; seminibus ut in præcedente muricatis. — I follow Nees in applying this name to an annual plant, and in supposing that Cavanilles was wrong in taking his *Justicia sexangularis* for a perennial, as also was Vahl in following him. I also suppose that the character, well represented by Cavanilles, of some subsessile and some long-pedunculate involucres, is not constant, the former being mostly wanting in our specimens. From the habitat it is not so probable that the following species was known a hundred

years ago. We have it in Coulter's collection (no. 557 of the "Californian" collection, doubtless North Mexican); from Magdalena, Sonora, no. 1028 of Thurber's collection, and on the Yaqui River, from Palmer; also from Lower California, collected by Xantus; but not from any station within the United States.

DICLIPTERA TORREYI. Caulibus e caudice perenni lignescente plurimis simpliciusculis sæpius strictis circiter pedalibus; foliis omnibus lanceolatis cum petiolo brevi sub-sesqui-pollicaribus; involucri bracteis cordato-rotundis sæpius emarginatis; seminibus papillis acutis nudis scabris. — *D. resupinata*, Torr. Bot. Mex. Bound. 125; Gray, Syn. Fl. ii. 331, maxima pro parte. — Arizona, *Thurber*, *Wright*, *Schott*, *Rothrock*, *Lemmon*, *Pringle*, &c. The involucres seem always to be pedunculate, more or less; the peduncles are either simple and naked, or bibracteate and bearing either one or two to four umbellate secondary peduncles.

Labiatæ.

SALVIA LEMMONI. *Fulgentes*, *S. Grahami* peraffinis, undique puberula; caulibus simpliciusculis (pedalibus) herbaceis e basi suffruticosa; foliis subdeltoideo- vel oblongo-ovatis inæqualiter serrulatis, basi truncata vel parum cuneata; bracteis parvis canescentibus; calyce angustiore atomifero; corolla (pollicari) angustiore magis exserta minus ventricosa. — S. W. Arizona, in the Huachuca Mountains, *Lemmon*, *Pringle*. In Lemmon's collection of 1881, this was passed as a form of *S. Grahami*, which varies much; but the specimens collected by Pringle in 1884 confirm the moderate distinctions. The latter have smaller and narrower leaves and still less ventricose corolla. Only the base or caudex, from which the nearly simple stems arise, is lignescent. It would be an acquisition to the gardens.

CEDRONELLA BREVIFLORA. *C. pallidæ*, Lindl., nimis affinis, pariter foliis omnibus subcordatis petiolatis obtusis, sed minutissime puberula; foliis floralibus verticillastra compacta subsuperantibus; dentibus calycis (lin. 3–4 longis) attenuato-subulatis corollam parvam subæquantibus. — S. Arizona, in the Santa Rita Mountains, alt. 7,000 feet, *Pringle*. The specimens seem to be in normal condition; but the corolla is very small and inconspicuous, the limb hardly surpassing the calyx-teeth, the lips barely a line long.

Var. HAVARDI. Thyrso capituliformi; calycis dentibus latioribus; corolla lin. 4–5 longa e calyce semi-exserta, labiis lineam longis. — Cliffs and ravines of the Chisos Mountains, W. Texas, on the borders of Chihuahua, *Dr. V. Havard.*

CEDRONELLA PALLIDA, Lindl. Bot. Reg. 32, t. 29, is known only from the figure and description. It was raised from seeds, probably from Chihuahua; and if the species varies as widely as does *C. cana*, Hook., it may include the plants above characterized. But Lindley's figure makes the stem and calyxes hirsutely pubescent, the inflorescence open, the flowers nearly an inch long, and the lower lip of the corolla 3 or 4 lines long.

CEDRONELLA CANA, Hook., as to the originally published form, we cannot well distinguish from *C. Mexicana*. But in New Mexico it runs into a form, var. LANCEOLATA (collected by *Dr. Rusby* and by *G. R. Vasey*), with small, narrowly-lanceolate, and entire leaves, which differ most widely from *C. Mexicana*.